Exhibit 4: Marin County Resource Conservation District (MRCD) Initial Study and Mitigated Negative Declaration (MND) for the Marin Coastal Watershed Permit Program (preceded by MRCD minutes adopting the MND on June 9th, 2004 [item4])

MARIN RESOURCE CONSERVATION DISTRICT

80 Fourth Street /P. O. Box 1146, Point Reyes Station CA. 94956
Phone: (415) 663-1170 Fax: (415) 663-0421

MINUTES

DATE: June 9, 2004
PLACE: Marin County Farm Bureau
520 Mesa Road, Point Reyes Station, CA94956

1. ***A regularly scheduled meeting was called to order by President, Hank Corda at 9:12a.m.*** Roll call of directors: Sally Gale, Richard Plant, Bob Giacomini and Steve Doughty. Staff: Nancy Scolari, Tristy Schewe, Sita Mulligan, SLM Consulting; Tom Moore, USDA Natural Resources Conservation Service; Stan Gilmar, Tomales Bay Watershed Council; Denise Peary Fisher, Prunuske Chatham, Inc.; Henry Grossi, Marin Farm Bureau; Gordon Bennett, Sierra Club; Kathie Lowrey, Prunuske Chatham, Inc.; Lauren Hammack, Prunuske Chatham, Inc.; John Parodi, The Bay Institute; Daniel Mountjoy, Natural Resources Conservation Service; Tony Nelson, Marin Agricultural Land Trust; Sheila Semans, State Coastal Conservancy; Jacob Resneck, Point Reyes Light; Tom Baty.

ACTION ITEMS:

2. WALKER CREEK WATERSHED-
   A. *Request Board approval of contract for Prunuske Chatham, Inc. for 205j Walker Creek Watershed Geomorphology grant. .*
      M/S/C by Sally/Steve to approve contract for Prunuske Chatham, Inc. for 205j Walker Creek Watershed Geomorphology grant.
3. WATERSHED COUNCIL-
   A. *Request Board decision regarding issue of watershed council members involvement with RCD funders.*
      M/S/C by Steve/Richard to consider the issue of Watershed Council involvement with RCD funders. Sally feels that members of the Watershed Council are interfering with the State Coastal Conservancy, a long-time funder of the RCD. Sheila wanted to make it clear that as a state agency, she would not discourage the public from calling with concerns. Sheila's original intention was that the RCD and the Watershed Council work on the project together and that this program could potentially serve as a model for other watersheds. Steve does not believe that the Council should have a say in our projects. However, Sheila said that the TAC will have the most input, which will include a representative from the Council, as well as various other agencies. Stan doesn't feel there was a problem between the RCD and the Council until he saw the article in the Point Reyes Light and he still doesn't think there is a problem. The Council's intention is to work with the RCD, as they are part of the Council. Nancy thinks it is best to address these issues because we do not want to ruin the relationship with our funders, with landowners, or with each other. No one wins in this situation, including the environment. Bob made some suggestions for improvement, including more agricultural representation on the council and that Michael Mery step down from his position in the Council until things settle. Sally concluded that all concerns should come to the RCD Board first before any actions are taken and that the Council should re-evaluate their role in the community, their goals, and their relationship with the RCD. Gordon supports that everyone should follow the processes and come to the Board with

issues first. M/S/C by Sally/Steve to postpone issue with a respectful request that Stan take this conversation back to the executive committee and then report back to the RCD.

4. MARIN COASTAL PERMIT COORDINATION PROGRAM -
   A. *Request Board consideration of public comments on Mitigated Negative Declaration (MND) for and determination of changes to final document.*
      At the last meeting, the Board approved the Mitigated Negative Declaration. It then went out for a 30-day public review period. Comments have been incorporated into the original document. M/S/C by Sally/Steve to adopt public comments as recommended.
   B. *Request Board approval of Final Mitigated Negative Declaration and Initial Study.*
      M/S/C by Sally/Richard to approve the Final Mitigated Negative Declaration and Initial Study.
   C. *Board approval of the Marin Coastal Watersheds Permit Coordination Program*
      M/S/C by Sally/Steve to approve the Marin Coastal Watersheds Permit Coordination Program.
   D. *Board review and approval of projects for implementation under the 2004 Permit Coordination Program (TBAG/SCC generated projects).*
      TAC will assist RCD with projects. M/S/C by Sally/Richard to approve projects for implementation under the 2004 Permit Coordination Program.
5. STATE COASTAL CONSERVANCY-
   A. *Request Board decision of qualifications needed for technical advisory committee members. .*
      This proposal to the SCC is different because we are completing CEQA on practices with no identification of projects. The proposal is tied to the Permit Coordination Program. Board needs to select the technical advisory committee or qualifications of the committee. Sally proposed a list of possible group involvement: RCD, Prunuske Chatham, Inc., State Coastal Conservancy, Natural Resources Conservation Service, Point Reyes National Seashore, Ag Extension, Point Reyes Bird Observatory, Dept. of Fish and Game, Audobon Canyon Ranch, and the Watershed Council. Individual people from each group can be determined by Nancy, Hank and Sheila. Sheila would like to meet with Nancy to devise the list for the TAC. M/S/C by Richard/Steve to refer to a Sheila and Nancy to form a committee.
6. SAN GERONIMO BEDLOAD SEDIMENT REDUCTION PROGRAM-
   A. *Request Board approval of additional funds to complete the 2003 monitoring report.*
      A new site was added, leading to increased cost, going $3000 over PCI's budget. Greg Andrew is okay with moving maintenance money to monitoring. M/S/C by Sally/Richard to approval additional funds to complete the 2003 monitoring report.
   B. *Request Board decision to proceed with recommended maintenance activities.*
      M/S/C by Sally/Steve to table until Nancy can talk to Greg Andrew. PCI estimated $12,000 in maintenance cost.
7. MARIN RCD FINANCIALS-
   A. *Approval of Minutes.*
   B. *Payment of Bills and presentation of Financial Report.*
      M/S/C by Richard/Sally to approve minutes and presentation of Financial Report.

INFORMATIONAL ITEMS:

8. UPDATES/PROGRAMS-
   - Tomales Bay Watershed Council -
   - USDA Natural Resources Conservation Service- (See Technical Assistance Reports).
   - **Tomales Bay Watershed** – Prop 13 photo monitoring, Tristy presented the May Issue of the Land Steward and a sneak preview of the upcoming September Issue, SCC proposal submittal
   - **Lagunitas Creek Watershed Enhancement Program** – submittal of full proposal for US EPA State-Tribal-Local Wetlands Program Development Grant, coordinate with Stillwater Sciences re: local site visit/information gathering.

- **Walker Creek Watershed** – MMWD extension granted until June 2005, 205J TAC meeting, 205J meeting with PCI and Regional Board to finalize SOW, DFG contract being developed, Walker Creek Landowner Meeting July 15th.
- **Stemple Creek Watershed**– No Update.
- **Americano Creek Watershed** – Watershed meeting to be held June 24th in Valley Ford.
- **Stafford Lake Watershed** – A draft report of the Erosion Site Inventory has been completed.
- Marin Coastal Permit Coordination Program – Initial study review and public comment period.
- District –Minutes, Form 700 Filing, Staff Analysis.

9. ANNOUNCEMENTS-
   - Press Releases: "Point Reyes Confab set on mercury in bay", "Straus Dairy waste to generate power", "Veneman Announces $22.8 million in grants for renewable energy initiatives", "Watershed Council at odds with Resource Conservation District".
   - Alternatives Workshop for Giacomini Wetland Restoration Project. June 22nd. Red Barn.
   - Americano Watershed Meeting. June 24th. Valley Ford School.
   - Leadership and Strategic Planning workshop. June 24-25. La Quinta.
10. CORRESPONDENCE
   - March 16th meeting summary for the 2004 Tomales Bay Pathogen TMDL Public Meeting.
   - Draft of Environmental Assessment for Point Reyes National Seashore available for review.
11. PUBLIC COMMENT:
   - Public comment for any matter not listed on this agenda, provided that no Board action is to be taken. All statements that require a response will be referred to staff to be placed on the next agenda.
12. MEETING ADJOURNED – 12:07 M/S/C by Sally/Richard to adjourn.

13. CLOSED SESSION: Personnel Meeting – M/S/C by Richard Steve to hire additional staff but not to exceed $25/hr for part-time with potential for full time employment. Board has decided that office visiting hours will be Monday – Thursday from 10am – 3pm. Staff has been directed to look into computer expenses.

MARIN RESOURCE CONSERVATION DISTRICT

INITIAL STUDY

AND

MITIGATED NEGATIVE DECLARATION

FOR

MARIN COASTAL WATERSHEDS PERMIT COORDINATION PROGRAM

June 9, 2004

Prepared by:

Marin Resource Conservation District
Post Office Box 1146
Point Reyes Station, CA 94956
(415) 663-1170

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Post Office Box 828
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This Report Has Been Prepared Pursuant To The
California Environmental Quality Act of 1970
State of California

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Appendices

INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION

1. Project title: Marin Coastal Watersheds Permit Coordination Program

2. Lead agency name and address:
   Marin Resource Conservation District
   P.O. Box 1146
   Pt. Reyes Station, California 94956

3. Contact person and phone number: Nancy Scolari 415-663-1170

4. Program location: Stemple, Walker, and Lagunitas Creek watersheds, the Marin County portions of the Estero Americano watershed, and smaller, unnamed watersheds leading directly to Tomales Bay and the Pacific Ocean, including lands on the Point Reyes Peninsula, Marin County (see Figure 1 and Areas not Included in the Program Description).

5. Program sponsors' names and addresses:

   Marin Resource Conservation District
   P.O. Box 1146
   Pt. Reyes Station, CA 94956

   Natural Resources Conservation Service
   1301 Redwood Way, Suite 170
   Petaluma, CA 94954

6. General plan designation:
   Numerous

7. Zoning:
   Numerous

8. Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)

   The program provides coordinated regulatory review for implementation, under the sponsorship of Marin RCD/NRCS, of 16 specific conservation and restoration practices that are intended to reduce erosion and enhance aquatic and terrestrial habitat in the Marin County coastal watersheds. See detailed Program Description and Environmental Protection and Mitigation Measures below. The Initial Study Checklist follows.

9. Surrounding land uses and setting: Briefly describe the project's surroundings:

   Surrounding lands are primarily grazing, dairy, or rural private property.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

    California Department of Fish and Game
    NOAA Fisheries
    U.S. Fish and Wildlife Service
    U.S. Army Corps of Engineers
    San Francisco Bay RWQCB
    North Coast RWQCB
    California Coastal Commission
    State Historic Preservation Office
    County of Marin
    State Coastal Conservancy
    National Park Service

Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this program, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐	Aesthetics	☐	Agriculture Resources	☐	Air Quality
☐	Biological Resources	☐	Cultural Resources	☐	Geology/Soils
☐	Hazards & Hazardous Materials	☐	Hydrology/Water Quality	☐	Land Use/Planning
☐	Mineral Resources	☐	Noise	☐	Population/Housing
☐	Public Services	☐	Recreation	☐	Transportation/Traffic
☐	Utilities/Service Systems	☐	Mandatory Findings of Significance		

Determination

The Marin Resource Conservation District (RCD) has determined that the Marin Coastal Watersheds Permit Coordination Program would not have a significant effect on the environment. The Marin RCD identified potential impacts to biological resources, geology and soils, hazards and hazardous materials, hydrology and water quality, and mandatory findings of significance. The program as described in the initial study discusses these potential impacts and the measures in the program that are to be incorporated in the project to reduce any potential impacts to resources to a less than significant level. The evidence supporting this determination is drawn from information provided by regulatory agencies, including the California Department of Fish & Game, North Coast Regional Water Quality Control Board, San Francisco Bay Regional Water Quality Control Board, U.S. Army Corps of Engineers, NOAA Fisheries, and the U.S. Fish & Wildlife Service, and from the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Field Office Technical Guide Practice Standards and Specifications (FOTG), the NRCS National Engineering Handbook, and the Engineering Field Manual. Each practice has been developed and field-tested over the past 60 years by NRCS engineers, geologists, biologists, agronomists, and other specialists to arrive at the current national standards and specifications. Modifications for California conditions have been made for some practices, as needed. The expected environmental impacts of each practice under California conditions have been assessed and documented in Conservation Practices Physical Effects included in the NRCS FOTG. This documentation is on file for public inspection at the Marin RCD office, 80 Fourth Street, Point Reyes Station, CA 94956. It is also available on the RCD's website at http://www.sonomamarinrcds.org/district-mc/index.html.

Signature	Date
Printed Name	For

Marin Coastal Watersheds Permit Coordination Program
PROGRAM DESCRIPTION

Program Sponsors

The mission of the Marin Resource Conservation District (RCD) is to conserve and enhance Marin County's natural resources, including its soil, water, vegetation, and wildlife. In the past 15 years, the RCD has administered over $3 million of government and private foundation grants for watershed-wide planning, erosion control, and restoration projects. Today, the Marin RCD continues to bring together state, federal, and local agencies with private landowners to conserve soil and water resources. Projects focus on:

- Control of soil erosion
- Riparian habitat restoration
- Protection and improvement of water quality
- Education and outreach
- Conservation of rangeland, cropland, and forest
- Active support of the district's agricultural economy and heritage

The California Public Resources Code (PRC) specifically empowers any RCD to manage soil conservation, water conservation, erosion control, erosion prevention, or erosion stabilization projects (PRC §9415). The code also allows an RCD, with the consent of affected private property owners, to make improvements or conduct operations that will further water conservation and the prevention and control of soil erosion (PRC §9409).

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), the RCD's federal partner for the program, provides technical assistance and cost-sharing to private landowners ("cooperators") working in partnership with the RCD/NRCS to develop conservation systems uniquely suited to their land and individual way of doing business. NRCS, formerly the Soil Conservation Service, builds on the strength of more than 60 years of natural resource protection on private lands. The agency works closely with local Resource Conservation Districts and other agencies, organizations, and individuals to prioritize conservation goals, work with people on the land, and provide assistance.

Marin RCD and NRCS employees have technical expertise and field experience to help land users solve their natural resource challenges and maintain and improve their economic viability. Employees bring a variety of scientific and technical skills to bear on resource planning, including soil science, fisheries biology, fluvial geomorphology, riparian botany, agronomy, biology, agro-ecology, range conservation, engineering, cultural resources, and economics. The technical support provided by the RCD/NRCS to agricultural operators is based on conservation systems designed to sustain and improve soil and water quality by addressing erosion control, pesticide and nutrient management, flood control, and streambank stabilization. They use a watershed approach to conservation that utilizes ecological principles and resource science to evaluate and manage the aggregate effects of multiple individual land uses. Biotechnical enhancement of natural systems is achieved through installation of conservation practices such as those included in this permit coordination program.

Need for Program

The Marin coastal watersheds have experienced water quality problems and a reduction in the quality and quantity of in-stream habitat capable of fully supporting anadromous fish populations due to increased fragmentation, sedimentation, water temperature, and nutrients in the watercourses. Erosion and fine sedimentation are pervasive throughout the watersheds. This program seeks to minimize creation of fine sediments by controlling erosion and implementing healthy land management practices.

As in many other coastal watersheds, the combination of overland runoff, streambank erosion, runoff from roads, and the effects of years of land use disturbance have caused serious impacts to water quality and to fish and wildlife habitat. The link between agricultural runoff, streambank erosion, water quality, and fish and wildlife habitat in west Marin are a concern for agricultural, conservation, and regulatory interests. Increased focus on non-point source pollution by federal, state, and local regulatory agencies presents ranch and dairy operators with serious management challenges.

A growing number of landowners in the coastal watersheds of Marin County are interested in restoring or enhancing the natural resources of their property. However, current regulatory review processes that are intended to protect natural values often act as *dis*incentives to voluntary efforts to reduce nonpoint source pollution and enhance habitat. Through the Marin Coastal Watershed Permit Coordination Program, the RCD/NRCS will work directly with landowners to promote voluntary actions that will improve water quality and wildlife habitat values.

Because agriculture is the area's predominant land use, on-farm conservation activities can lead to significant water quality and habitat improvements throughout the watersheds. Ranch planning is a key component of this program, and more than 75 ranch plans have already been written to provide tailored direction on best management practices, several of which require approval from regulatory agencies. By selecting conservation and restoration practices suitable for coordinated review, the permit coordination program will help existing, successful, voluntary conservation projects reach their full potential.

As landowners see the success of their neighbors' projects, willingness to cooperate in voluntary conservation programs is expected to increase. The RCD and NRCS have established relationships with individual landowners and the community that are necessary to the success of voluntary projects. They also have the expertise and funding to carry out these restoration practices and, perhaps more importantly, state and federal mandates to protect our natural resources by working with private landowners.

General Description of Proposed Action

The Marin Coastal Watersheds Permit Coordination Program will provide the catalyst for high quality erosion control and habitat restoration throughout the Tomales Bay area. The program is based on a model of coordinated, multi-agency regulatory review that ensures the integrity of agency mandates but makes permitting more accessible to farmers and ranchers than the traditional process.

Through the program, regulatory agencies issue permits to the RCD/NRCS that cover projects on private lands provided landowners work under the supervision and sponsorship of the RCD and/or NRCS. The RCD and NRCS will decide each year

which of the season's proposed construction projects will meet with the environmental protection limitations of the permits and select those for the permit coordination program. The following types of projects are not covered by the permit coordination program:

- Projects by private landowners not working the RCD and NRCS.
- Projects that cannot fulfill the environmental protection measures established in the permitting process.
- Projects of any type other than the 16 named conservation practices.

Actions permitted on lands in the Marin coastal watersheds under the auspices of this program are limited to implementation and maintenance of the following 16 conservation and restoration practices. Limitations on grading dimensions and volumes associated with each practice are found on Table 2 following the list of practices included in the program below. When regulatory agencies have different standards for issuing permits, this program adopts the most restrictive. When this program references other documents that may contain less restrictive standards, only the more restrictive standards will be used.

Conservation and Restoration Practices Included in the Program

The following 16 conservation and restoration practices are included in the permit coordination program. General conditions and conditions for specific conservation practices to avoid or minimize adverse impacts begin on pages 20 and 28, respectively. Specific conditions on the practices are also cross-referenced in the table below.

Table 1: Conservation and Restoration Practices Included in the Program

ACCESS ROADS	Improves existing fixed routes for moving livestock, produce, or equipment and provides access for property management while controlling runoff to prevent erosion and maintain or improve water quality. An example of the practice might include regrading and outsloping a road so that water is less erosive as it travels across the road. This practice is limited to existing roads. [See specific mitigation measures to avoid or minimize adverse impacts on page 33.]
ANIMAL TRAIL AND WALKWAY	Provides a travel lane for animals to walk through difficult or ecologically sensitive terrain. This practice is installed on grazing lands as part of a conservation plan to improve access to forage or water. It is designed to divert livestock away from ecologically sensitive or erosive sites. [See specific mitigation measures to avoid or minimize adverse impacts on page 29.]
CRITICAL AREA PLANTING	Planting vegetation such as trees, shrubs, vines, grasses, or legumes, on highly erodible or critically eroding areas (does not include tree planting mainly for wood products). This practice is used to stabilize the soil, reduce damage from sediment and runoff to downstream areas, and improve wildlife habitat and visual resources. This practice can be used to replant areas where invasive vegetation has been removed or as an ancillary to stream restoration activities. Native plants characteristic of the local habitat type shall be the preferred alternative when implementing and maintaining the practices in natural areas. [See specific mitigation measures to avoid or minimize adverse impacts on page 29.]

FILTER STRIP [1]	Installation of a strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater. Installation often requires soil manipulation to remove surface irregularities and prepare for planting. This practice is used between agricultural land and environmentally sensitive areas. When the field borders are located such that runoff flows across them in sheet flow, coarser-grained sediments are filtered and deposited. Pesticides and nutrients are removed from runoff through infiltration, absorption, adsorption, decomposition, and volatilization, thereby protecting water quality downstream. When established, filter strips may also reduce erosion. [See specific mitigation measures to avoid or minimize adverse impacts on page 29.]
FISH STREAM IMPROVEMENT	Improving a stream channel to create new fish habitat or to enhance an existing habitat. This practice is used to improve or enhance aquatic habitat for fish in degraded streams and ditches by providing shade, controlling erosion, and restoring pool and riffle stream characteristics. Pools and riffles are formed in degraded stream sections through the strategic placement of root wad or natural rock that reduces the flow velocity through the area. Coarse-grained sediments settle, reducing the quantity of sediment delivered downstream. Although this practice may require the placement of rock, use of rock is kept to a minimum. Increased shading from shrub and tree plantings may decrease water temperature during the warm season. Dissolved oxygen content may be increased, improving the stream's assimilative capacity. [See specific mitigation measures to avoid or minimize adverse impacts on page 30.]
GRADE STABILIZATION STRUCTURE	A structure built into a gully or downcutting channel to control the grade, to stabilize the slope, to prevent headcutting and formation or advancement of gullies, and to enhance the natural functioning of the channel, including raising the water table and allowing for establishment of vegetation. This practice refers to brush, erosion control fabric, rock, or timber structures that do not impound water but rather allow water to be conveyed in a stable manner, resulting in reduced erosion and improved downstream water quality. This practice is intended to promote biotechnical approaches; hard structural solutions will be recommended only in unusual circumstances and will require justification in order to secure regulatory approval. Grade stabilization structures in perennial or fish-bearing channels are not permitted under this program. [See specific mitigation measures to avoid or minimize adverse impacts on page 31.]
GRASSED WATERWAY	A natural or constructed waterway that does not have a defined bed and bank and that is shaped or graded to required dimensions and velocities and then planted with suitable vegetation for the stable conveyance of runoff. This practice is designed to reduce erosion in a concentrated

[1] Riparian buffers, which are areas of predominantly trees and/or shrubs located at the lower edges of fields adjacent to and up-gradient from watercourses or waterbodies, are the preferred treatment over use of filter strips. The RCD and NRCS fully support the use of riparian buffers. The riparian buffer conservation practice was not included in the permit coordination program as the construction of riparian buffers does not require permits.

	flow area such as a gully. It is designed to reduce sediment and substances delivered to receiving waters. Vegetation may act as a filter in removing some of the sediment delivered to the waterway, although this is not the primary function of a grassed waterway.
LINED WATERWAY	The placement of an erosion-resistant lining (i.e., erosion control blanket) along a gully or outlet. The lined waterway allows for the safe disposal of runoff from other conservation structures or from natural concentrations of flow where unlined or grassed waterways would be inadequate. The practice is not used for irrigation water conveyance.
PIPELINE	Pipeline installed for conveying water for livestock from a source of supply to point of use for the purpose of directing livestock away from streams and lakes. This practice is designed to reduce bank erosion, sediment yield, and manure in watercourses. This practice is included in the permit coordination program when it crosses a stream or watercourse. [See specific mitigation measures to avoid or minimize adverse impacts on page 32.]
SEDIMENT BASIN	Basins constructed to collect and store debris or sediment. Sediment basins trap sediment, sediment-associated materials, and other debris. They prevent undesirable deposition on bottom lands and in waterways and streams. Basins are generally located at the base of agricultural lands adjacent to natural drainage or riparian areas. The practice does not treat the source of sediment but provides a barrier to reduce degradation of surface water downstream. The design of spillways and outlets will include water control or energy dissipation structures to prevent scouring at discharge point into natural drainage. Sediment basins will be installed for the purpose of controlling fine sediments. They will not be constructed in any stream channel (perennial or intermittent) or other permanent waterbodies. Sediment basins will be designed to avoid permanently ponding water. Water will be held only for the amount of time necessary to allow fine sediment to settle out. Sediment basins are often installed in conjunction with measures to control upstream sediment sources. When the source of the erosion is off property or inaccessible, a sediment basin is an appropriate stand-alone practice. [See specific mitigation measures to avoid or minimize adverse impacts on page 32.]
SPRING DEVELOPMENT	Improvement of springs and seeps by fencing out livestock, excavating, cleaning, capping or providing collection and storage facilities. Spring development is included in this program for circumstances where developing a spring will have minimal effects on spring habitat and provide water quality improvements to nearby waterways. Spring development may not result in impacts to or drying up of wetlands and cannot result in a loss of wetland habitat that relies on the spring as a water source. This practice is used to improve the distribution of water or to increase the quantity of water for livestock and wildlife. Water-bearing soil and rocks are developed, and piping is installed to a trough or tank away from the spring. A wooden or concrete box backfilled with gravel may also be constructed to hold the water to be piped. The area around the spring may be fenced to control livestock and, therefore, improve the wildlife habitat value of the spring or seep. Developing sources of water away from riparian areas and waterbodies; designed to reduce the

	impacts of livestock on those areas as well. Development is confined to springs or seepage areas that can furnish a dependable supply of water. Water flow from the spring or seep may be temporarily reduced during the construction period. Spring development uses an excavation process that does not result in the placement of fill in or around spring areas.
STREAMBANK PROTECTION	Installation of vegetation or other treatments to stabilize and protect banks of streams or excavated channels against scour and erosion. The banks of streams and waterbodies are protected to reduce sediment loads causing downstream damage and pollution, to improve the stream for fish and wildlife habitat, and to protect adjacent land from erosion damage. This practice is intended to promote biotechnical approaches; hard structural solutions will be recommended only in unusual circumstances and will require justification in order to secure regulatory approval. Streambank protection measures that involve riprap, rock, or other structural components used to prevent localized stream erosion, sediment transport, or movement will require conventional permitting and are not authorized in the permit coordination program. However, rock used to facilitate natural stream processes and dynamics with the purpose of achieving stream equilibrium between erosional and depositional processes will come under the permit coordination standards. This practice can be applied to natural or excavated channels where the streambanks are susceptible to erosion from the action of water or debris or due to damage from livestock or vehicular traffic. [See specific mitigation measures to avoid or minimize adverse impacts on page 31.]
STREAM CHANNEL STABILIZATION	Stabilization of a streambed with suitable structures or plantings. This practice is used in stream channels that are undergoing damage or degradation that cannot be controlled with upslope practices. The design and installation of stream channel stabilization structures produce a stable streambed favorable to wildlife and riparian growth. Stream channel stabilization structures that involve riprap, rock, or other structural components used to prevent localized stream erosion, sediment transport, or movement will require conventional permitting and are not authorized in the permit coordination program. However, rock used to facilitate natural stream processes and dynamics with the purpose of achieving stream equilibrium between erosional and depositional processes will come under the permit coordination standards. This practice is intended to utilize in-stream structures made of natural materials such as boulders and logs to provide channel stability. [See specific mitigation measures to avoid or minimize adverse impacts on page 31.]
STRUCTURE FOR WATER CONTROL	Removal or replacement of existing culverts in streams and other waterways when they are either not functioning properly or are a barrier to fish passage. This practice is intended to remove culverts entirely where possible. Careful consideration will be given to addressing upslope sources of flow that are causing the need for a culvert (i.e., rather than replacing an undersized or defective culvert in an in-sloped road with a properly sized, functioning culvert, the road will be outsloped to eliminate the need for the culvert). If determined to be environmentally

	beneficial, new culverts may also be installed under this program. New or replacement culverts will be sized for a 24-hour, 25-year storm event hydraulic capacity, but smaller culverts may be used (minimum 10-year storm event hydraulic capacity but not less than 15 inches in diameter) if topography and overflow facilities exist to prevent damage from larger storms. [See specific mitigation measures to avoid or minimize adverse impacts on page 33.]
UNDERGROUND OUTLETS	A conduit installed beneath the surface of the ground to collect surface water and convey it to a suitable outlet. Clean runoff from ranchland or farmland can be conveyed to a stream or other waterway using this practice, which is designed to prevent concentrated surface flow that could cause erosion or transport of nutrients. The outlet of the pipe to a stream or other waterway will include an energy dissipater. Underground outlets will be designed so as to not negatively alter a stream hydrograph. [See specific mitigation measures to avoid or minimize adverse impacts on page 29.]
WATER AND SEDIMENT CONTROL BASIN	An earthen embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. These basins reduce concentrated off-site flow and associated erosion by metering out runoff following large storm events. This practice traps and removes sediment and sediment-attached substances from runoff. Basins are often located alongside riparian or wetland environments to buffer impacts of upslope runoff and sediment prior to release to a natural drainage. The minimum design capacity will insure detention of a 10-year, 24-hour storm event. The outlet control for water and sediment basins will be designed to hold water no longer than is needed to reduce design storm peak discharges to the stream and prevent ponding, stagnation, and eutrophication of the water. Outlet design for a 24-hour release period results in sediment deposition and drains the basin in anticipation of additional rainfall. This practice will not be used in a stream channel or other permanent waterbodies. [See specific mitigation measures to avoid or minimize adverse impacts on page 32.]

Limitations on Project Size

The conservation projects are limited in size (see Table 2). The estimations of average figures are based on typical projects installed in the watersheds in the last 10 years. These maximums are based on definitions of small projects from regulatory agencies.

Table 2: Maximum Grading Dimensions and Volumes Associated with Implementation of Practices

Conservation Practice	Length (Feet)	Dimensions (Acres)	Volume (Cubic Yards)
Access Roads	1 mile*		4,000
Animal and Livestock Cross	10-15 wide	0.125	250
Critical Area Planting	2,000	1	500
Filter Strip	500	1	1,500
Fish Stream Improvement	2,000	3	1,000
Grade Stabilization Structure	Crosswise structure – 60 across x 20 stream length Lengthwise structure – 20 across x 60 stream length	N/A	100 cubic yards per structure of fill
Grassed Water Way	2,000	2.5	2,000
Lined Waterway	300	0.05	1,000
Pipeline	50 (along the channel)	0.25	50
Sediment Basin	N/A	1	1,500
Spring Development	N/A	0.05	50
Stream Channel Stabilization	500	1	7,500
Streambank Protection	500	0.5	7,500
Structure for Water Control	100	0.25	500
Underground Outlet**	N/A	0.10	20
Water and Sed. Control Basin	N/A	1	1,500

* Access road improvements typically involve multiple installations spread out over a long reach of road. The 1-mile maximum on roadwork covers the cumulative area of disturbance; however, the reach of road improved may be much longer than 1 mile.

** Dimensions are only for the outlet for the energy dissipater.

The 16 conservation practices included in the program are recommended by the U.S. Environmental Protection Agency, the California State Water Resources Control Board, the California Coastal Commission, and the California Department of Fish and Game as appropriate resource management practices to protect and restore fish and wildlife habitat. They are designed to control erosion and sedimentation; to increase aquatic, riparian, and upland habitat values; and to stabilize eroding stream channels. The estimated number of projects is 5-15 annually.

Actions not Included in the Program

This permit coordination program does not include projects that involve grade stabilization structures in fish-bearing streams, water diversions, dams, or any project that is likely to adversely affect sensitive resources, including federally-listed salmonids or their critical habitat. Stream channel stabilization structures that involve riprap, rock, or other structural components used to prevent localized stream erosion, sediment transport, or movement are classified as stream channel hardening projects and are not authorized by the permit coordination program (see discussion of allowable use of rock in the Conditions for Specific Conservation Practices to Avoid or Minimize Adverse Impacts: Grade Stabilization Structure, Streambank Protection, and Stream Channel Stabilization section below). [SFBRWQCB] Landowners working with the RCD/NRCS on projects that do not qualify for this permit coordination program either because they involve actions other than the 16 listed practices or they cannot meet the size limits or permit conditions must use the traditional permit mechanism wherein the RCD and the landowner are responsible to comply with CEQA and obtain individual permits on a project-by-project basis from each regulatory agency.

Further, if the NRCS Environmental Assessment Worksheet discussed in the Planning and Permitting Mechanisms for Individual Projects section on page 16 leads to the conclusion that a project has potential to result in significant adverse environmental impacts, the project is not permitted under this permit coordination program. If significant adverse environmental impacts are expected to result from a proposed project, the landowner will be encouraged to consider alternative actions or obtain regulatory review and permits in the traditional manner.

Geographic Scope

The Marin coastal watersheds encompass approximately 232 square miles (148,480 acres) of Marin County (see Figure 1). The program area covers the watersheds of three creeks— Lagunitas, Stemple, and Walker—as well as smaller, unnamed creeks leading directly to Tomales Bay and the Pacific Ocean. This permit coordination program covers all portions of these watersheds that lie within Marin County, other than areas specifically excluded (see details in Areas not Included in the Program section below). It also includes agricultural operations that occur within the boundaries of the Point Reyes National Seashore, which is managed by the National Park Service.

Areas not Included in the Program

Areas that have been determined to be particularly sensitive by regulators are excluded from the program area. These include:

1. The waters of Estero de San Antonio.
2. Tidally-influenced wetlands and waters.
3. Any portion of watershed lands outside of Marin County boundaries.
4. Vernal pools.
5. Dune habitat.


Marin Coastal Watersheds
Permit Coordination Program
Sustainable Conservation
SONOMA
MARIN
Stemple Creek Watershed
Walker Creek Watershed
Lagunitas Creek Watershed
Stemple Cr
Walker Cr
Lagunitas Cr
Tomales Bay
Fallon
Dillon
Tomales
Hamlet
McDonald
Cypress Grove
Marshall
Lairds Lndg
Sacramento Lndg
Reynolds
Marconi
Millerton
Inverness
Mount Vision
Bivalve
Point Reyes Station
Inverness Park
Olema
Tocaloma
Jewell
Nicasio
Forest Knolls
Woodacre
San Geronimo
Lagunitas
Shafter
Five Brooks
Features
Private Lands
Public Lands Leased to Private Operators
County Line
Study Area
Watershed Boundary
Highway 1
Streams of Interest
Other Hydrology
Sources: Department of Fish & Game, USGS, GreenInfo Network
Map Date: August 15, 2000

Figure 1

Topography

In the northern part of the program area, topography is characterized by the relatively low hills of the Stemple Creek and northern Walker Creek watersheds. Moving south, the landscape becomes more rugged as Walker Creek and Lagunitas Creek (and its major tributary, Olema Creek) wind through narrow, steep-sided canyons.

Descriptions of Natural Watercourses

- Stemple Creek:
  Stemple Creek flows westward through the watershed to its estuary, the Estero de San Antonio. The Estero empties into Bodega Bay, a broad indentation of the Pacific Coast. The stream system has a dendritic (branching) drainage system in the eastern third of the watershed. Stemple Creek originates in the northeast corner of the watershed and flows southwesterly to a point near Two Rock, where two unnamed streams join it. From there to the coast, the drainage pattern is trellis like, with numerous parallel tributaries entering the main stem from the north and the south. Stemple Creek becomes the Estero de San Antonio just west of Highway 1. U.S. Geological Survey maps show the main stem of Stemple to have perennial flow from the Two Rock area to the Coast.

- Walker Creek:
  The headwaters of Walker Creek lie in both Marin and Sonoma Counties. The creek runs west to Tomales Bay where it enters Tomales Bay near the once historic town of Hamlet. The creek flows through an alluvial valley encircled by gently rolling hills. The watershed contains 73 square miles, some of which lies outside the program area, and contains four main sub-watersheds: Chileno Creek, which flows through Chileno Valley; Arroyo Sausal and Salmon Creek, which flow through Hicks Valley; and Keys Creek, which flows through the low hills east of Tomales. Stream channels in the upper watershed, including Arroyo Sausal, Salmon Creek, and the mainstem of Walker Creek, have downcut dramatically, leaving old stream terraces high above the stream channel. Soulajule Reservoir, built and maintained by the Marin Municipal Water District (MMWD), isolates Arroyo Sausal from the rest of the watershed approximately 2.75 miles upstream of Walker Creek.

- Lagunitas Creek, including Olema Creek:
  Lagunitas Creek is the largest drainage emptying into Tomales Bay. Much of the 103-square mile watershed consists of open space and watershed land. A few beef ranches occur in the lower watershed. The watershed originates on the northern slopes of Mount Tamalpias and flows northerly for approximately 25 miles before entering the bay. Five main tributaries feed Lagunitas Creek: Nicasio Creek, San Geronimo Creek, Olema Creek, Devil's Gulch, and Deadman's Gulch. Flows within the watershed are highly regulated by reservoirs in the upper watershed. Only San Geronimo Creek and Olema Creek are not regulated. Relative to other streams in the program area and throughout coastal California, Lagunitas Creek is in good condition and supports notable runs of steelhead and coho.

- Estero Americano:
  The Estero Americano is a coastal estuary at the base of Americano Creek. It forms a portion of the northern boundary between Marin and Sonoma counties where it drains into Bodega Bay. In some years, a seasonal sand bar at the mouth restricts tidal exchange. Periods of hypersalinity have been recorded in the Estero. When the mouth is open, the tidal influence ranges up to 4 miles upstream. Americano Creek, the sole tributary of the Estero, is ephemeral and generally dries up for 4 to 6 months between late spring and fall.

- Other small tributaries:
  The program area also includes many small, primarily unnamed tributaries draining directly to Tomales Bay or the Pacific Ocean, including lands on the Point Reyes Peninsula. Several, including Schooner and Home Ranch Creeks, are known to support steelhead populations. Most, however are believed to be non-fish bearing streams, although potential usage by strays is considered.

Existing Land Use

The following is excerpted from the Marin Coastal Watersheds Enhancement Project, prepared by U.C Cooperative Extension in 1995

The predominant land used in much of the northern part of the program area is, and has been for over 100 years, animal agriculture, including beef, sheep, and dairy production. Cultivated crops, including potatoes and hay, at one time also played an important role in the local economy. Other land uses now include non-agricultural open space and recreation. Tomales Bay and its tributaries also support commercial shellfish production and commercial and recreational fishing.

The importance of the different agricultural commodities produced in this region has ebbed and flowed over the years and has varied somewhat by watershed due to the suitability of the land and climate to producing different crops. Dairying, which was widespread throughout West Marin at one time, is now concentrated in the northern part of the program area, where topography is gentle, rural residential development is less extensive, and grasslands are the predominant vegetation type. Beef ranching and some sheep ranching also occur throughout the area. Scattered throughout the agrarian setting are several small communities, which originated as agricultural and fishing villages and summer touring destinations.

Further south, in the Lagunitas Creek watershed, logging was once an important industry. Much of this area is now owned by MWWD and is used to supply water to residents of East Marin.

Several agricultural facilities operate on the Point Reyes peninsula, which is federal parkland in the Point Reyes National Seashore. The National Park Service leases land to agricultural operators, many of whom are served by the RCD or NRCS. Although these lands are publicly held, they are included in the program area in order to provide the operators with the opportunity to improve the lands by installing erosion control and habitat improvement projects.

ENVIRONMENTAL PROTECTION AND MITIGATION MEASURES

The intent of the permit coordination program and the associated conservation and restoration practices is to reduce erosion and sedimentation and to enhance habitat values in the watersheds of coastal Marin County. Project implementation will maximize water quality and/or the health of the natural resources and will contribute to agricultural sustainability. Work in areas with sensitive resources has the potential to negatively affect those resources without careful planning. Thorough environmental protection measures have been developed in coordination with each regulatory agency to prevent or reduce the environmental impacts of restoration under the permit coordination program. When regulatory agencies have different standards for issuing permits, this program adopts the most restrictive. When this program references other documents that may contain less restrictive standards, only the more restrictive standards will be used.

These protective measures are intended as minimum conditions that will be incorporated into the design and implementation of each site-specific restoration project under the permit coordination program. With the incorporation of the protective measures, any potential environmental effects of the permit coordination program are avoided or reduced to less than significant levels. In addition, the permit coordination program allows for each regulatory agency to impose more stringent conditions on a site-by-site basis if those more stringent conditions will result in greater resource protection and even further lessening of potential environmental effects.

The minimum protective measures are described in detail below. They include general conditions such as temporal limitations on construction, limitations on earthmoving and construction equipment, guidelines for removal of plants and revegetation, conditions for erosion control, limitations on work in streams and permanently ponded areas, and limitations on use of pesticides, herbicides, and fertilizers. They also include detailed protective measures required for each specific conservation practice encompassed by the permit coordination program.

Description of Programmatic Permitting Mechanisms

To assist agricultural landowners with regulatory compliance, the RCD and NRCS seek to offer "one-stop permit shopping" to landowners in Marin coastal watersheds who agree to work under the guidance of the RCD and NRCS to achieve important water quality and habitat conservation and restoration goals. The Marin Coastal Watersheds Permit Coordination Program involves obtaining approval or agreements from all local, state, and federal agencies with jurisdiction over one or more of the 16 conservation practices included in the program. Following is a list of agencies participating in the permit coordination program and the type of permit or approval:

- U.S. Fish and Wildlife Service – Endangered Species Act (ESA) Section 7 Consultation/Incidental Take Statement
- NOAA Fisheries – ESA Section 7 Consultation/Incidental Take Statement
- U.S. Army Corps of Engineers – Clean Water Act §404 Nationwide Permits
- California Department of Fish and Game – Memorandum of Agreement and 1603 Streambed Alteration Agreement
- North Coast and San Francisco Bay Regional Water Quality Control Boards – Waste Discharge Requirements or Clean Water Act §401 Certification

- County of Marin – Determination of Consistency with Local Coastal Plan
- California Coastal Commission—Coastal Zone Management Act
- Gulf of Farallones National Marine Sanctuary—Sanctuary Permit

Both programmatic and individual permit terms and conditions from all of the regulatory agencies listed above will be included with the individual project design standards and specifications for each project implemented under this program. They will also be included as conditions of the contract between the landowner and the RCD/NRCS discussed in the Cooperator Agreements and 1601/1603 Individual Permits section below. Individual property owners and managers participating in this program are referred to as "cooperators," who are defined by the RCD/NRCS as ranchers, growers, and land managers who have signed a Request for Assistance and Notice Regarding the Procedures for Conformance with Multiple Permits.

Planning and Permitting Mechanisms for Individual Projects

The RCD/NRCS Conservation Planning Process

The RCD/NRCS utilizes a rigorous planning process. As a federal agency, the NRCS must ensure project works are compliant with the National Environmental Policy Act (NEPA). NRCS is required to conduct an Environmental Evaluation for assistance it provides according to the NRCS-NEPA rules (7 CFR 650), which became effective in 1979 and as updated by California Amendment CA4 in 2000. This rule prescribes the assessment procedures under which NRCS-assisted actions are to be implemented. The procedures are designed to insure that environmental consequences are considered in decision-making and to allow NRCS to assist individuals and non-federal public entities to take actions that protect, enhance, and restore environmental quality.

The NRCS 9-step conservation planning process is used to customize a management plan unique to the conditions of a local property and its manager. A conservation plan describing the selected management system is prepared, and a NEPA-compliant Environmental Assessment Worksheet (EAW) is completed as part of each conservation plan to document potential short-term, long-term, and cumulative effects of the proposed actions as well as the on-site and off-site impacts. (The RCD/NRCS planning documents are provided in Appendix 1.)

The NRCS planning steps and the associated planning documents are listed below in Table 3. Not all of the planning documents are generated anew for each ranch, but rather they are based on templates, which exist for each major land use or cropping system in California. Modifications to the templates and the resulting conservation plan are based on the assessment of site-specific conditions. Alternatives are evaluated by the landowner and NRCS, which result in a specific land use plan, including detailed recommendations and an engineered plan, if necessary.

Table 3: NRCS Conservation Planning Process

	NRCS PLANNING STEP	DOCUMENT USED	RESULTS
Step 1	**Consultation**		Identify resource problems with the cooperator (land operator) and other specialists.
Step 2	**Determine objectives**		Identify, agree on, and document the cooperator's objectives.
Step 3	**Inventory the resources**	***Checklist of Resource Problems or Conditions***.	The checklist prompts the inventory team to provide quantitative or qualitative data in several resource categories: Soils, Water, Air, Plants, Animals, and Human (social, economic, and cultural).
Step 4	**Analyze resource data**	***Site-specific Practices Effects Worksheet***	Each of the resource problems or concerns identified during the inventory is itemized in a matrix. All current resource management practices and all potential improved practices are also listed in the matrix. The anticipated negative or positive effects of each of the listed practices on each of the resource concerns are evaluated in the matrix using a three-point scale.
Step 5	**Formulate alternative solutions**	***Resource Management System (RMS) Guidesheet***.	Groups of practices ('resource management systems') that result in a significant positive improvement in all resource problem categories are identified as alternative systems in the guidesheet. Other groups of practices are also listed as additional alternatives as long as they do not result in a negative effect on resource problems. This process is also known as an "alternatives analysis." Ideally the minimal number of practices that can collectively address all resource problems provides the most efficient and economical alternative for the cooperator.
Step 6	**Evaluate alternative solutions**	***Conservation Effects Treatment Options Worksheet***	To assist the cooperator in selecting an alternative system, the NRCS staff may choose to present each alternative resource management system (RMS) in contrast with current management conditions in the worksheet. The net effects of implementing the RMS can be shown in terms of resource protection, crop production improvements, economic costs or other terms of interest to the cooperator decision-maker.
Step 7	**Cooperator determines course of action**	***Conservation Plan and Environmental Assessment Worksheet***	Select optimal set of conservation practices to maximize resource protection and enhancement. NRCS prepares conservation plan and specifications and project Environmental Assessment Worksheet.
Step 8	**Cooperator implements plan**		Practices are implemented according to NRCS recommended design, standards, and specifications and with NRCS on-site technical support, if needed.
Step 9	**Evaluation of results of plan**		Evaluate effectiveness of plan and make adjustments as needed.

The RCD and NRCS evaluate the impacts of proposed projects to ensure a net environmental gain. The NRCS's competitive EQIP awards funds on the basis of environmental improvements; the projects that offer the greatest environmental gain are most likely to be awarded funds. Projects undertaken by private landowners participating

in the permit coordination program represent resource gains that might not otherwise occur in the absence of the program. Private landowners undertake these activities on a voluntary basis, and the resource gains that result represent net gains in environmental quality through installation of conservation practices that reduce erosion and sedimentation and oftentimes result in habitat enhancements that would likely be absent if a landowner were required to obtain individual permits on their own. The implementation of the permit coordination program in other watersheds, such as the Elkhorn Slough in Monterey County, has demonstrated the increase in the number and quality of projects that individual private landowners undertake as participants in the permit coordination program. While these projects should not be compared with large restoration projects with significantly greater resources at hand than the typical private landowner will have at their disposal, they do represent a net gain in environmental protection on a small scale. Cumulatively, these small scale erosion control and habitat enhancement projects can result in significant resource gains over time.

Public Review of Individual Projects

In May or June of each year, after development of preliminary designs, the RCD Board of Directors will publicly consider the projects to be proposed to the program regulators for the coming construction season. Following the Board's consideration, the public may submit written suggestions for improving the proposed projects. The comments will be accepted for 30 days following the Board's consideration.

Individual Project Notification to Regulators

The RCD/NRCS shall provide regulators, including but not limited to the U.S. Fish & Wildlife Service, NOAA Fisheries, U.S. Army Corps of Engineers, Regional Water Quality Control Boards, California Department of Fish & Game, and Marin County, with written notification of the proposed projects to be performed. Notification shall consist of the following information:

- Project identification and location.
- Nature of work and description of project need.
- Approved practices to be installed.
- Location of work to be performed.
- Project dimensions (width, length, volume & slope, if applicable).
- Approximate volume of discharge below the ordinary high water mark (OHWM).
- When native vegetation will be removed and revegetation will occur, a visual assessment of dominant native shrubs and trees, approximate species diversity, and approximate coverage.
- Environmental setting – surrounding habitat, adjacent land use.
- Potential presence of listed species.
- Estimated number of creek crossings and type of vehicle.
- Presence of barriers to aquatic species migration.

Upon receipt of the notification list of projects, regulators will review the individual design and construction specifications for each proposed project. They may request a meeting or site visit(s) to review the projects (see example of the San Francisco Bay RWQCB's process below). They will verify consistency of individual projects with the goals and conditions of the program and may provide additional conditions to the Cooperator

Agreement for individual projects, which shall be included as part of the individual project plan.

The San Francisco Bay RWQCB has identified the key provisions for their approval of individual projects to include the following to insure that the projects implemented are adequately protective of water quality and beneficial uses:

1. Site reconnaissance, arranged in advance, with RCD and/or NRCS personnel or their representatives, as well as other regulatory agencies and technical experts, if possible, during the pre-project design phase in order to identify site constraints and the range of acceptable conservation and restoration practices.
2. Submission of preliminary project designs.
3. Follow-up site visit, as needed and arranged in advance with RCD and/or NRCS personnel or their representatives, to finalize design.
4. Submission of final design and supporting information regarding environmental impacts to resources and species at project site.
5. Written approval by Water Board Executive Officer.
6. Optional site visit(s), arranged in advance with RCD and/or NRCS personnel or their representatives, during construction and after project completion.
7. Annual post-project monitoring report.

The San Francisco Bay RWQCB will incorporate a 60-day project approval deadline into their permit dating from the submission of a complete final project design (step 4 above), although approval may occur more quickly if the process proceeds as outlined above, and there has been sufficient communication prior to submission of final designs. DFG will issue their Cooperator Agreements and 1601/1603 Individual Permits as discussed below**.**

Cooperator Agreements and 1601/1603 Individual Permits

Individual property owners and managers participating in this program are referred to as "cooperators." The RCD/NRCS define "cooperators" as ranchers, growers, and land managers who have signed a Request for Assistance and Notice Regarding the Procedures for Conformance with Multiple Permits. Individual Cooperator Agreements between RCD/NRCS and the landowner and/or party legally responsible for carrying out the work and the contractors performing the work will be signed that will ensure that projects are constructed in compliance with conservation planning and regulatory safeguards.

A 1601/1603 Individual Agreement based upon the final design for the Cooperator Agreement shall be issued by the California Department of Fish and Game (see sample in Appendix 2). The RCD/NRCD shall attach the Individual Agreement to the signed Cooperator Agreement and notify the cooperator that the Individual Agreement is an additional binding requirement supplemental to the Cooperator Agreement. Procedures to ensure compliance and to address non-compliance with permits are discussed below.

Procedures for Complying with Permits

The RCD/NRCS will administer the project program using a manual designed specifically for the permit coordination program. The guidebook creates a process for ensuring individual projects qualify for the program; lists conservation practice selection, design, and implementation criteria and conditions required by the agencies in their individual permits; provides information on endangered species habitat; and details the monitoring and reporting requirements of the program.

Training for RCD/NRCS staff working on this program will clearly stipulate the special conditions of the program and the level of attention that RCD/NRCS project staff is required to expend on design and monitoring duties for projects that may affect listed species. Prior to project implementation, all project workers will be given information on the rare, threatened, and endangered (RTE) species in the project area, a brief overview of the species' natural history, the protection afforded the species by the local, state, and federal Endangered Species Acts and regulations, and the specific protective measures to be followed during implementation of the practices. Videos, brochures, books, and briefings may be used in the educational project, provided qualified RCD/NRCS staff is on hand to answer questions.

Procedures to Address Non-Compliance with Permit Conditions

If a cooperator does not carry out work in compliance with project design standards and specifications, including the previously agreed upon terms and conditions, the RCD or NRCS will notify the cooperator and work directly with them to resolve the problem. If the cooperator still fails to conform, the RCD or NRCS will notify the cooperator that their activities are inconsistent with the standards and specifications contained in their contracts and that the cooperators' actions are no longer covered by the project's programmatic and individual permits and agreements. The cooperator will then be responsible for obtaining regulatory review and individual permits from the appropriate regulatory agencies and will be held liable for all violations.

General Conditions to Avoid or Minimize Adverse Impacts

The RCD/NRCS and the participating regulatory agencies have developed the following general measures that are intended to reduce or avoid to less than significant the potential adverse effects of actions to be covered by this program. The California Department of Fish & Game (DFG) has provided a series of conditions in their Memorandum of Agreement (MOA) with the RCD and NRCS, which are referred to herein as "[DFG XX]" with "XX" being the specific condition number in the DFG MOA. These measures and recommendations from the San Francisco Bay RWQCB [SFBRWQCB], as appropriate for a specific action, are included as special conditions on practices installed by the RCD/NRCS as a part of this program.

1. Temporal Limitations on Construction

   The RCD and NRCS shall ensure that adverse impacts do not occur during routine operations by implementing the following temporal limitations on construction:

   - The timing of project construction will take into consideration fisheries and other wildlife usage in the project area. Practices will be implemented and annual maintenance restricted to the period between June 1 and October 15. Work in

and around streams that support anadromous fish populations may not begin until June 15. [DFG GC1]

- Where habitat for federal and state-listed species is identified on or adjacent to the project work site, construction and activities that may disturb the breeding, feeding, mating, and/or sheltering of these species shall be performed only as prescribed by NOAA Fisheries, U.S. Fish & Wildlife Service, and/or DFG.

- Construction within 75 feet of established riparian vegetation will be avoided during the migratory bird nesting season (February 15 to August 31) to avoid damage or disturbance to nests. If work must occur during this period, a qualified biologist or individual approved by DFG will conduct a pre-construction survey for bird nests or nesting activity in the project area. If any active nests or nesting behavior are found (for species other than starlings and house sparrows), an exclusion zone of 75 feet shall be established to protect the nesting riparian birds. If any listed or sensitive bird species are identified, DFG must be notified prior to further action. Take of active bird nests is prohibited. [DFG GC 2]

- Work beyond October 15 may be authorized on a site-specific basis with approval from the North Coast or San Francisco Bay RWQCB, DFG, FWS, and/or NOAA Fisheries and provided the work would be completed prior to first winter rains and stream flows. [DFG GC1]

2. Limitations on Earthmoving

   The RCD and NRCS shall ensure that adverse impacts do not occur during routine operations by implementing the following limitations on earthmoving:

   - The implementation and maintenance of projects shall not result in sediment deposition in downstream areas. [DFG GC4]

   - Best management practices for construction period runoff and erosion control will be employed.

   - The projects are designed to be self-mitigating and to result in long-term sediment and erosion control and habitat restoration and preservation.

   - Disturbance to existing grades and vegetation will be limited to the actual site of the conservation project and necessary access routes.

   - Placement of temporary access roads, staging areas, and other facilities shall avoid or limit disturbance to habitat and shall be restored to preconstruction conditions.

   - Procedures for construction in sensitive environments shall be employed (see also, discussion in Limitations on Construction Equipment section below). These may include, but are not limited, to the following precautions and measures necessary to protect the environmental integrity of the site, as well as to protect all plants, animals, and aquatic life:

- All vehicles and equipment on the site must not leak any type of hazardous materials such as oil, hydraulic fluid, or fuel. Vehicles and equipment must be inspected and approved by the inspector before use. Fueling shall take place outside of the riparian corridor.

- Contractor shall have emergency spill clean up gear (spill containment and absorption materials) and fire equipment available on site at all times. These items are to be reviewed by the project inspector before construction begins.

- Access to the site must be thoroughly reviewed with the project engineer or inspector. Exact location of access way, number of trips planned, and type of vehicles used shall be discussed.

- Trash, litter, construction debris, cigarette butts, etc., must be stored in a designated area approved by the inspector or removed from the site at the end of each working day. Upon completion of work, contractor is responsible for removing all of these unwanted items to the satisfaction of the project engineer and/or inspector.

- Disturbance of native shrubs or woody perennials or removal of trees from streambanks or stream channels shall be avoided or minimized (see further discussion in Discussion of Biological Resources Section b) Protection of Riparian Habitat and other Sensitive Natural Communities in the following Initial Study Checklist).

- If native trees over 6" dbh (diameter at breast height) are to be removed, they will be replaced at a 3:1 ratio. If riparian vegetation will be disturbed, it will be replaced with similar native species.

- Upon completion of grading, slope protection of all disturbed sites will be installed prior to November 1 through a combination of permanent vegetative treatment, mulching, and/or rock.

- Native plants characteristic of the local habitat type shall be the preferred alternative when implementing and maintaining the practices in natural areas. When specified, as required by the regulatory agencies, only native plant species will be used. Under special circumstances, regulators may allow for the use of non-invasive, non-persistent grass species.

- Finished grades will not exceed 2:1 side slopes.

- Excavated material not used in the implementation of the practice will be removed and moved out of the 100-year flood plain.

3. Limitations on Construction Equipment

   The RCD and NRCS shall ensure that adverse impacts do not occur during routine operations by implementing the following limitations on construction equipment:

- When possible, work will be performed from the top of creek banks.
- Any work done with equipment in a creek will include a detailed description of the planned use of the equipment, including type of equipment, ingress and egress points, duration of time in creek, specific activities to be accomplished with equipment, and measures to be employed to minimize impacts on streambed and bank and riparian vegetation. [SFBRWQCB]
- Equipment will only be allowed in Lagunitas and Olema Creeks and other sensitive creek habitats under special circumstances (to be determined by the San Francisco Bay RWQCB and DFG during project review. [SFBRWQCB]
- Use of heavy equipment shall be avoided in a channel bottom with rocky or cobbled substrate. If access to the work site requires heavy equipment to travel on a rocky or cobbled substrate, a rubber tire loader/backhoe is the preferred vehicle. Only after this option has been determined impossible will the use of tracked vehicles be considered. [DFG GC5]
- The amount of time heavy equipment is stationed, working, or traveling within the creek bed shall be minimized. [DFG GC5]
- When heavy equipment is used, woody debris and vegetation on banks and in the channel shall not be disturbed if outside of the project's scope. [DFG GC5]
- Heavy equipment shall not be used in a flowing stream, creek, or ponded area, except to cross a stream or pond to access the work site. [DFG GC5]
- No work shall occur in flowing or standing water, or in permanent or seasonally ponded areas except as described in DFG Section E, "Special provisions for implementation and maintenance of Grade Stabilization, Structure, Streambank Protection and Stream Channel Stabilization." [DFG GC3] Section E protection measures include:
  - Construction and maintenance of grade stabilization structures in streams or creeks that support a salmonid fishery or a historic salmonid fishery shall be the subject of a specific Agreement under Fish and Game Code 1600, et seq., and are not part of this program.
  - No chemically-treated timbers shall be used for grade or channel stabilization structures, bulkheads, or other in-stream structures.
  - Sediment removal from the stream channel or ponds may occur if it will improve biological functioning of the stream and restore channel capacity. Measures to control upslope sediment sources will be implemented where feasible and access allows.
  - Sediment removal may not occur in a flowing stream or standing water.
- No gabions, grouted rock, or concrete will be used in any waterway (fish-bearing or non fish-bearing) for grade stabilization, stream channel stabilization, streambank protection, or fish stream improvement projects. [SFBRWQCB]
- In specific cases where it is deemed necessary to work in a flowing stream/creek, the work area shall be isolated, and all flowing water shall be temporarily diverted around the work site to maintain downstream flows during construction. When construction is completed, the flow diversion structure shall be removed in a

manner that will allow flow to resume with the least disturbance to the substrate. [DFG GC3]

- RCD shall schedule excavation and grading activities for dry weather periods (see discussion in Temporal Limitations on Construction section above).
- The use or storage of petroleum-powered equipment shall be accomplished in a manner to prevent the potential release of petroleum materials into waters of the state (Fish and Game Code 5650). [DFG GC11] The following precautionary measures will be followed:
  - If needed, a contained area located at least 50 feet from a watercourse will be designated for equipment storage, short-term maintenance, and refueling. If possible, these activities will not take place on the project site.
  - Vehicles shall be inspected for leaks and repaired immediately.
  - Leaks, drips and other spill are cleaned up immediately to avoid soil or groundwater contamination.
  - Major vehicle maintenance and washing shall be done off site.
  - All spent fluids including motor oil, radiator coolant, or other fluids and used vehicle batteries shall be collected, stored, and recycled as hazardous waste off site.
  - Dry cleanup methods (i.e. absorbent materials, cat litter, and/or rags) shall be used whenever possible. If water is used, the minimal amount required to keep dust levels down shall be used.
  - Spilled dry materials shall be swept up immediately.
- All construction debris and sediments shall be taken to appropriate landfills or in the case of sediments, disposed of away in upland areas or off-site.
- When possible, RCD/NRCS shall use existing ingress or egress points.

4. Removal of Plants and Revegetation

The RCD and NRCS shall ensure that adverse impacts do not occur during routine operations by implementing the following limitations on removal of plants and revegetation:

- The project area shall be restored to pre-construction condition or better.
- All exposed soil resulting from the project's construction activities shall be revegetated using live planting, native seed casting, or hydroseeding. Native plants characteristic of the local habitat type shall be the preferred alternative when implementing and maintaining the practices in natural areas. When specified, as required by the regulatory agencies, only native plant species will be used. Under special circumstances, regulators may allow for the use of non-invasive, non-persistent grass species.

- Non-invasive, non-persistent grass species (i.e., barley grass) may be used as nurse crops or for their temporary erosion control benefits to stabilize disturbed slopes until natives are established. [DFG GC6]

- No more than 0.10 acres of native riparian shrubs or woody perennials shall be removed from a stream area. Where the area contains a mix of native and invasive species, up to 0.25 acres may be removed from a streambank or stream channel. If the area is exclusively non-native plants, up to 5 acres of riparian vegetation may be removed. Any area cleared of vegetation must be revegetated with native plant species. Non-invasive, non-persistent grass species (i.e., barley grass) may be used in conjunction with native species to provide fast establishing, temporary cover for erosion control. [DFG GC6]

- Any streambank area left barren of vegetation as a result of the implementation or maintenance of the practices shall be restored to a natural state by seeding, replanting, or other agreed upon means with native trees, shrubs, and/or grasses prior to October 15 of the project year. Work beyond the time frame may be authorized following consultation with and approval of the local DFG biologist, provided it could be completed prior to first flows. Barren areas shall typically be planted with a combination of willow stakes, native shrubs, and trees and/or erosion control grass mixes. [DFG GC7]

- Except with approval from DFG staff, there shall be no cutting or removal of native trees 4" or greater diameter at breast height (dbh), except willows, for which there shall not be cutting or removal of trees 6" or greater dbh. For any permitted removal of any native tree, the root structure of the tree shall be left intact unless authorized by DFG staff. [DFG GC10]

- Soil exposed as a result of construction and soil above rock riprap will be revegetated using native seed casting or by hydroseeding prior to October 15 of the project year. In general, interstitial spaces between rocks will be planted with riparian vegetation such as willows rather than hydroseeded. [SFBRWQCB] Native plants characteristic of the local habitat type shall be the preferred alternative when implementing and maintaining the practices in natural areas. When specified, as required by the regulatory agencies, only native plant species will be used. Under special circumstances, regulators may allow for the use of non-invasive, non-persistent grass species

- Planting in areas that require live planting may occur beyond October 15 with approval from the regulatory agencies if success of planting live vegetation is increased due to favorable environmental conditions.

- The spread or introduction of exotic plant species shall be avoided to the maximum extent possible by avoiding areas with established native vegetation

during project activities, restoring disturbed areas with native species where appropriate, and post-project monitoring and control of exotic species.

- Removal of invasive exotic species is strongly recommended. Removal using hand tools, including chainsaws and weedwhacker, and hand pulling of exotics shall be done in preparation for establishment of perennial plantings. To the extent possible, revegetation shall be implemented at the same time removal of exotic vegetation occurs.

- If *Arundo donax* is removed, cuttings will be disposed of in a manner that will not allow reseeding to occur.

- All projects will be monitored by RCD/NRCS for a 5-year period. In addition, monitoring for projects that have obligations to monitor for a longer period will continue past 2008. In addition, vegetative practices will be monitored until vegetation is established. Annual inspections for the purpose of assessing the survival and growth of revegetated areas and the presence of exposed soil shall be conducted for 2 years following the end of project. The RCD/NRCS shall note the presence of native/non-native vegetation and extent of exposed soil, photographing the vegetation during each inspection. The RCD/NRCS shall provide the location of each project, before and after photos, areas revegetated, planting methods and plants used, and the success of the revegetation project in the Marin Coastal Watersheds Permit Coordination Program Annual Report provided to the regulatory agencies each January.

- For projects that have removed native vegetation, post-construction revegetation success shall be equivalent or better to the pre-project conditions. If after 5 years, that level of success has not been achieved, the RCD shall consult with DFG to develop and implement measures to achieve success. [DFG GC8]

5. Conditions for Erosion Control

   The RCD and NRCS shall ensure that adverse impacts do not occur during routine operations by implementing the following conditions for erosion control:

   - Erosion control and sediment detention devices shall be incorporated into the project design and implemented at the time of construction. These devices shall be in place prior to October 15 for the purposes of minimizing fine sediment and sediment/water slurry input to flowing water and of detaining sediment-laden water on site. These devices will be placed at all locations where the likelihood of sediment input exists. Sediment collected in these devices shall be disposed of away from the collection site and above the normal high water mark. These devices will be inspected regularly to ensure they are functioning properly.

   - The project site shall be restored to pre-construction condition or better. Disturbed areas shall be revegetated prior to October 15 of the project year by live planting, native seed casting, or under special circumstances with regulatory approval by hydroseeding. See also, requirements in Limitations on Earthmoving,

Limitations on Construction Equipment, and Removal of Plants and Revegetation sections above.

- When implementing or maintaining a critical area planting above the high water line, a filter fabric fence, biodegradable fiber rolls, gravel bars, and/or hay bales shall be utilized, if needed, to keep sediment from flowing into the adjacent waterbody. At the time vegetation is sufficiently mature to provide erosion control, it may be appropriate to remove the fence, fiber rolls and/or hay bales. Annual review by RCD/NRCS shall occur until the critical area planting is established to control erosion.

- All debris, sediment, rubbish, vegetation or other material removed from the channel banks, channel bottom, or sediment basins shall be removed to a location where they shall not re-enter the waters of the state.

- All petroleum products chemicals, silt, fine soils, and any substance or material deleterious to fish, plant, or bird life shall not be allowed to pass into, or be placed where it can pass into the waters of the state.

6. Limitations on Work in Streams and Permanently Ponded Areas

The RCD and NRCS shall ensure that adverse impacts do not occur during routine operations by implementing the following limitations on work in streams and permanently ponded areas:

- Hand labor shall be used to trim vegetation within the channel or on the bank. Handheld equipment such a weedwhackers and chainsaws are authorized. [DFG GC9]
- In specific cases where it is deemed necessary to work in a flowing channel or ponded area and no alternative exists to dewatering, RCD/NRCS shall develop a dewatering plan with guidance from NOAA Fisheries and DFG. Dewatering shall be supervised by a qualified biologist (see detailed discussion in the Biological Resources section of the Initial Study Checklist).
- Use of heavy equipment shall be avoided in a dry channel bottom with rocky or cobbled substrate. If access to the work site requires heavy equipment to travel on a rocky or cobbled substrate, a rubber tire loader/backhoe is the preferred vehicle. Only after this option has been determined impossible will the use of tracked vehicles be considered. [DFG GC5]
- The amount of time heavy equipment is stationed, working, or traveling within the creek bed shall be minimized. [DFG GC5]
- When heavy equipment is used, woody debris and vegetation on banks and in the channel shall not be disturbed if outside of the project's scope. [DFG GC5]
- Heavy equipment shall not be used in a flowing stream, creek or ponded area, except to cross a stream or pond to access the work site. [DFG GC5] See detailed requirements in Limitations on Construction Equipment section above.

- No work shall occur in flowing or standing water, or in permanent or seasonally ponded areas except as described in DFG Section E, "Special provisions for implementation and maintenance of Grade Stabilization, Structure, Streambank Protection and Stream Channel Stabilization." [DFG GC3] See detailed requirements in Limitations on Construction Equipment section above.
- If the substrate of a seasonal pond, creek, stream or waterbody is altered during work activities, it shall be returned to approximate pre-construction conditions after the work is completed, unless the RCD/NRCS and NOAA Fisheries and/or DFG determine that other measures should be implemented.
- All debris, sediment, rubbish, vegetation or other material removed from the channel banks, channel bottom, or sediment basins shall be removed to a location where they shall not re-enter the waters of the state.
- All petroleum products chemicals, silt, fine soils, and any substance or material deleterious to fish, plant, or bird life shall not be allowed to pass into, or be placed where it can pass into the waters of the state.

7. Limitations on Use of Pesticides, Herbicides, and Fertilizers

   The RCD and NRCS shall ensure that adverse impacts do not occur during routine operations by implementing the following limitations on use of pesticides, herbicides, and fertilizers:

   - No pesticides, with the exception of or herbicides application as described below to control established stands of exotics or to control the invasion of exotics into restoration plantings, shall be used as part of the permit coordination program.
   - No herbicides shall be used where threatened or endanger species occur.
   - In general, hand labor shall be used to control exotic vegetation at the site. Under extreme circumstances and with regulatory approval, herbicides may be applied to control established stands of non-native species. Application shall be compliant with the California Department of Pesticide Use regulations in accordance with Material Safety Data Sheets, the Marin County Agriculture Commission's Weed Management Plan, manufacturer's instructions, and/or under the guidance of a registered pesticide advisor.
   - Where it is necessary to use herbicides to control established stands of exotics or to control the invasion of exotics into restoration plantings, the herbicides must be applied by hand by a licensed applicator in accordance with manufacturer's recommendations and registered label conditions. Herbicides must be applied directly to plants and may not be spread upon any water or where they can leach into waterways in subsequent rains. [DFG C2] Application shall occur in a manner that minimizes drip and drift into the water and only on calm days (wind less than 5 miles per hour) to prevent airborne transfer of herbicide.
   - In riparian environments, an herbicide (with or without a surfactant) that has been registered for use in an aquatic environment (i.e., Rodeo™) and on target vegetation will be utilized. No broadcast spraying will occur. Great care shall be taken to avoid contact with native species.

- On National Park Service lands, herbicides will be applied using backpack sprayers in accordance with National Park Service Integrated Pest Management regulations and California Department of Pesticide Use regulations in accordance with Material Safety Data Sheets. No foliar spraying is allowed in riparian habitats. Any proposed herbicide ground spraying within 100 feet of a creek are not included in the permit coordination program. During the dry season (July 1 to November 15), select stumps of non-native trees and shrubs within riparian zones may be treated by painting herbicides. [NPS]
- Organic amendments shall be used to ensure successful establishment of restoration vegetation associated with the practices.
- Organic fertilizers may be used above the normal high water mark the year of planting, if necessary. No chemical fertilizers shall be used. [DFG C2]

Conditions for Specific Conservation Practices to Avoid or Minimize Adverse Impacts

1. Animal Trail and Walkway, Filter Strip, or Underground Outlet

   In addition to the general limitations set forth in the previous section, the following measures will be employed for projects involving animal trail and walkways, filter strips, or underground outlets:

   - Construction or maintenance activities for the conservation practices shall not result in increases in turbidity in the stream (as measured by Nephelometric Turbidity Unit (NTU)) of more than 10% of the upstream background. [DFG B1]
   - Where construction of an underground outlet involves outletting a pipe into a stream, an energy dissipater shall be installed to reduce bed and bank scour. [DFG B2]
   - Underground outlets will be designed so as to not negatively alter a stream hydrograph. [SFBRWQCB]

2. Critical Area Planting

   In addition to the general limitations set forth in the previous section, the following measures will be employed for projects involving critical area planting.

   - When implementing or maintaining a critical area planting above the high water line, a filter fabric fence, fiber rolls and/or hay bales shall be utilized, if needed, to keep sediment from flowing into the adjacent waterbody. When vegetation is sufficiently mature to provide erosion control, it may be appropriate to remove the fence, fiber rolls and/or hay bales. Annual review by RCD and NRCS shall occur until the critical area planting is established to control erosion. [DFG C1]
   - No pesticides, with the exception of or herbicides application as described below to control established stands of exotics or to control the invasion of exotics into restoration plantings, shall be used as part of the permit coordination program.

- No herbicides shall be used where threatened or endanger species occur.
- In general, hand labor shall be used to control exotic vegetation at the site. Under extreme circumstances and with regulatory approval, herbicides may be applied to control established stands of non-native species. Application shall be compliant with the California Department of Pesticide Use regulations in accordance with Material Safety Data Sheets, Marin County Agriculture Commission's Weed Management Plan, manufacturer's instructions, and/or under the guidance of a registered pesticide advisor.
- Where it is necessary to use herbicides to control established stands of exotics or to control the invasion of exotics into restoration plantings, the herbicides must be applied by hand by a licensed applicator in accordance with manufacturer's recommendations and registered label conditions. Herbicides must be applied directly to plants and may not be spread upon any water or where they can leach into waterways in subsequent rains. [DFG C2] Application shall occur in a manner that minimizes drip and drift into the water and only on calm days (wind less than 5 miles per hour) to prevent airborne transfer of herbicide.
- In riparian environments, an herbicide (with or without a surfactant) that has been registered for use in an aquatic environment (i.e., Rodeo™) and on target vegetation will be utilized. No broadcast spraying will occur. Great care shall be taken to avoid contact with native species.
- On National Park Service lands, herbicides will be applied using backpack sprayers in accordance with National Park Service Integrated Pest Management regulations and California Department of Pesticide Use regulations in accordance with Material Safety Data Sheets. No foliar spraying is allowed in riparian habitats. Any proposed herbicide ground spraying within 100 feet of a creek are not included in the permit coordination program. During the dry season (July 1 to November 15), select stumps of non-native trees and shrubs within riparian zones may be treated by painting herbicides. [NPS]
- Organic amendments shall be used to ensure successful establishment of restoration vegetation associated with the practices.
- Organic fertilizers may be used above the normal high water mark the year of planting, if necessary. No chemical fertilizers shall be used. [DFG C2]
- Planting above the ordinary high water line may occur at any time of the year.
- If needed, an irrigation system shall be installed to ensure establishment of vegetation; when vegetation is sufficiently established, irrigation materials shall be removed. If irrigation system relies on water from a stream or creek, it will meet NOAA Fisheries Water Drafting Specifications (August 2001, or as updated). In addition to water drafting specifications, projects that are implemented within fish-bearing streams shall meet NOAA Fisheries Fish Screening Criteria (1997) and the addendum for Juvenile Fish Screen Criteria for Pump Intakes (May 9, 1996). [DFG C3]

3. Fish Stream Improvement

   In addition to the general limitations set forth in the previous section, the following measures will be employed for fish stream improvement projects:

- The Fish Stream Improvement conservation practice shall be designed and implemented in accordance with DFG's *California Salmonid Stream Habitat Restoration Manual*. [DFG D1]
- The RCD/NRCS shall consult with DFG personnel when designing fish stream improvement projects. Visits to project sites incorporating these practices may occur. [DFG D2]
- No chemically-treated timbers shall be used on in-stream structures. [DFG D3]
- When possible, the RCD/NRCS shall use existing ingress or egress points and perform work from the top of the creek banks.
- When requested by DFG or NOAA Fisheries, the RCD/NRCS shall inspect in-stream habitat and performance of sediment control devices at least once each day during construction to ensure the devices are functioning properly.

4. Grade Stabilization Structure, Streambank Protection, and Stream Channel Stabilization

   In addition to the general limitations set forth in the previous section, the following measures will be employed for grade stabilization structure, streambank protection, and stream channel stabilization projects:

   - Biotechnical approaches will be used for streambank protection. Only in unusual circumstances would non-biotechnical methods be approved by the program regulators. Incorporation of rock will be minimized and, if used at all, will need to be justified in order to secure regulatory approval for use in under this program. [SFBRWQCB]
   - Riprap, rock, or other structural components used to prevent localized stream erosion, sediment transport, or movement will require conventional permitting and will not be permitted in the permit coordination program. However, rock used to facilitate natural stream processes and dynamics with the purpose of achieving stream equilibrium between erosional and depositional processes will come under the permit coordination standards. [SFBRWQCB]
   - Rock that is used solely for the prevention or interference with natural stream functions is classified as a stream channel hardening project and is not be permitted in the permit coordination program. Rock used to support a defensible stream restoration design slope to create balance between the valley slope, sinuosity and channel slope, and rock used to support habitat requirements of aquatic and terrestrial fauna is classified as a restoration project. [SFBRWQCB]
   - Construction and maintenance of any practice that results in a permanent change in flow in streams that support a fishery are not permitted under this program. Projects seeking to implement conservation practices in those circumstances must seek individual permits from appropriate public agencies.
   - Construction and maintenance of grade stabilization structures in streams or creeks that support a salmonid fishery shall be the subject of a project-specific

Streambed Alteration Agreement under Fish & Game Code 1600 et seq; they are not authorized by this permit coordination program. [DFG E1]

- No chemically treated timbers shall be used for channel stabilization structures, bulkheads, or other in-stream structures. [DFG E2]

- No gabions, grouted rock, or concrete will be used in any waterway (fish-bearing or non fish-bearing) for grade stabilization, stream channel stabilization, streambank protection, or fish stream improvement projects. [SFBRWQCB]

- Sediment removal from the stream channel or ponds may occur if it will improve biological functioning of the stream and restore channel capacity [DFG E4]. Measures to control upslope sediment sources will be implemented where feasible and access allows.

- Sediment removal may not occur in a flowing stream or standing water. [DFG E4]

- When possible, the RCD/NRCS shall use existing ingress or egress points and perform work from the top of the creek banks.

- When requested by DFG or NOAA Fisheries, the RCD/NRCS shall inspect in-stream habitat and performance of sediment control devices at least once each day during construction to ensure the devices are functioning properly.

5. Pipeline

In addition to the general limitations set forth in the previous section, the following measures will be employed for pipeline projects:

- Pipeline shall be installed or maintained only when streambed is dry. [DFG F1]

- Trenching associated with this practice shall be a minimum of 3 feet deep. [DFG F2]

6. Sediment Basin and Water and Sediment Control Basin

In addition to the general limitations set forth in the previous section, the following measures will be employed for sediment basin and water and sediment control basin projects:

- Sediment basins will be installed for the purpose of controlling fine sediments. They will not be constructed in any stream channel (perennial or intermittent) [SFBRWQCB] or other permanent waterbodies. [DFG G1]
- Sediment basins will be designed to avoid permanently ponding water. Water will be held only for the amount of time necessary to allow fine sediment to settle out. [SFBRWQCB]
- The outlet control for water and sediment basins will be designed to hold water no longer than is needed to reduce design storm peak discharges to the stream and prevent ponding, stagnation, and eutrophication of the water. [SFBRWQCB]

- Construction or maintenance of sediment basins shall occur on or after August 1 to October 15 in areas where water and sediment control basins create conditions that attract nesting birds and other wildlife. [DFG G2]
- An energy dissipater shall be installed on outlets to reduce bed and bank scour. [DFG G3]
- Submittals for projects that involve sediment removal will describe the amount to be removed, method of removal, specific need for removal, and environmental protection measures to be used, including proper disposal of dredge spoils. [SFBRWQCB]
- Construction or maintenance activities for the conservation practices shall not result in increases in turbidity in the stream (as measured by Nephelometric Turbidity Unit (NTU)) of more than 10% of the upstream background. [DFG G4]
- Use of concrete is allowed for repair of eroding spillways on existing sediment basins and water and sediment control basins. If used, all concrete shall be allowed to cure for a minimum of 30 days before being exposed to stream water or water that may enter the stream, or all concrete shall be coated with a DFG-approved concrete sealant. If sealant is used, water shall be excluded from the site until the sealant if dry. [DFG B3]

7. Structure for Water Control (Culverts)

This practice will be used generally to replace or retrofit existing culverts. However, this program also covers the placement of new culverts when environmentally beneficial. In addition to the general limitations set forth in the previous section, the following measures will be employed for projects using the structure for water control practice:

- Culverts in fish-bearing streams will be consistent with DFG's "Culvert Criteria for Fish Passage" (September, 2001) and NOAA Fisheries Southwest Region's "Guidelines for Salmonid Passage as Stream Crossings" (September, 2001). [DFG H1]
- Culverts may be constructed in a flowing channel provided a dewatering plan is developed and followed.
- In addition to all environmental measures specified in the previous section, trash racks and livestock fences may be used near the culvert inlet on waterways that do not provide fish passage.

8. Limitations Related to Access Roads

In addition to the general limitations set forth in the previous section, the following measures will be employed for road improvement projects:

- Road improvements are modeled on the "Handbook for Forest and Ranch Roads: A Guide for planning, designing, constructing, reconstructing, maintaining and closing wildland roads," by William Weaver and Danny Hagans.

Maintenance of Conservation Practices

The erosion repairs to be installed will be designed to not need replacement or additional capital costs. Container plants will be maintained for one to two years following planting as part of the establishment period construction costs. From time-to-time, major storm events occur in west Marin County. In the rare event that such a storm would severely damage an enhancement project, the RCD will seek support from volunteers and/or other funding sources to stabilize the site. Long-term maintenance activities will occur utilizing the protective measures included in this document and requirements from regulators of the program.

Monitoring and Reporting Program

Pre- and During Construction Monitoring, Notification, and Reporting

Pre-construction monitoring of individual projects will include, but not be limited to, surveys and/or inspections, as needed, to ensure on-site compliance with all permit requirements. The RCD/NRCS will monitor on-site compliance until implementation of practices is complete. Procedures for complying with permits and to address non-compliance with permits conditions are discussed in the Permitting Mechanisms for Individual Projects section above. The RCD/NRCS, in consultation with the U.S. Fish & Wildlife Service and/or NOAA Fisheries, will determine the expertise needed by the monitor. For some projects, a qualified individual approved by FWS and/or NOAA Fisheries shall work with the species in question.

During project construction, erosion control and sediment detention devices shall be incorporated into the project design and inspected regularly to ensure they are functioning properly. When requested by DFG or NOAA Fisheries, the RCD/NRCS shall inspect in-stream habitat and performance of sediment control devices at least once each day to ensure the devices are functioning properly.

Post-Construction Monitoring, Notification, and Reporting

As part of their Cooperator Agreement, landowners agree to monitor their projects for a period of at least 10 years. Post-construction monitoring of RCD/NRCS-sponsored conservation and restoration practices will include, but is not be limited to, inspections of access roads, animal trails and walkways, critical area planting, filter strips, fish stream improvement measures, grade stabilization structures, grassed and lined waterways, pipelines, sediment basins, springs, fencing, stream channel and streambank conditions, riparian and upland revegetation, structures for water control, underground outlets, and water, and sediment control basins to determine if the systems are still functioning as planned. All construction sites will be inspected at least twice during the first rainy season after installation. Each site will also be inspected once at the end of the rainy season for the first 5 years following construction as required by the regulatory agencies. If any agency requests a site a visit, it will be coordinated with NRCS and RCD staff or their designated representative.

Under the permit coordination program, the RCD/NRCS will provide written notification of the status of all projects to permitting agencies in the form of an annual post-construction report due January 31 of each year for the five-year duration for this program. The report will list participating landowners, describe each project purpose, area affected, natural biological enhancements, and cut/fill volumes and slope of work. It will list conservation benefits and any net gains in wetlands and riparian areas,

describe actions taken to avoid adverse effects to listed species, and provide photo documentation of before and current site conditions. Photo-documentation will occur from photo points before construction and annually thereafter throughout the term of the monitoring program. Photographs will include both close-up and long-range shots.

All revegetation projects will be monitored by RCD/NRCS for a 5-year period. In addition, monitoring for projects that have obligations to monitor for a longer period will continue past 2008. In addition, vegetative practices will be monitored until vegetation is established. Annual inspections for the purpose of assessing the survival and growth of revegetated areas and the presence of exposed soil shall be conducted for 2 years following the end of project. The RCD/NRCS shall note the presence of native/non-native vegetation and extent of exposed soil, photographing the vegetation during each inspection. The RCD/NRCS shall provide the location of each project, before and after photos, areas revegetated, planting methods and plants used, and the success of the revegetation project in the Marin Coastal Watersheds Permit Coordination Program Annual Report provided to the regulatory agencies each January.

INITIAL STUDY CHECKLIST

I. AESTHETICS -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	X	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	X	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	X	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	X

Discussion of Aesthetics

The program will improve area aesthetics by enhancing and restoring native California vegetation along riparian corridors and wetlands at project sites. Short-term impacts on the scenic vista and visual character of project sites that may occur during construction of conservation and restoration projects will be immediately mitigated by installation of native vegetation and grasses in disturbed areas. When completed, the restoration and conservation projects will result in improved area aesthetics.

Finding: Less than significant impact.

II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	X
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	X

Discussion of Agricultural Resources

Implementation of the conservation practices will not adversely impact agricultural values and will not result in a substantial alteration in the present or planned land use of the area or a reduction in the acres devoted to agriculture. One purpose of the project is to improve agricultural sustainability and operations in the watersheds through stabilization of eroding soils and control of sediment discharges from agricultural land to watercourses. Several of the practices are specifically designed to remove pollutants from agricultural runoff before they enter the stream system and to limit livestock presence in and around watercourses.

Finding: No impact.

III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	X

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	X
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	X
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	X

Discussion of Air Quality

Although project activities may involve short-term emissions from construction equipment, implementation of the conservation practices will not have a significant effect on air quality and will not create odors.

Finding: No impact.

IV. BIOLOGICAL RESOURCES -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	X	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	X	☐	☐

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	x	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	x	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	x
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	x

Discussion of Biological Resources

Implementation and maintenance of the conservation practices may result in temporary and minor impacts to biological resources. Project activities that have potential to result in short-term impacts include soil excavation, grading, preparation of the ground for seeding and mulching, grade and stream stabilization, channel excavation, construction of earthen embankments, placement of fill, vegetation removal, and burial, trampling or crushing of vegetation from equipment and foot traffic. In certain cases, limited impacts to individual plants or animals in the form of mortality may occur after consultation with and approval from the appropriate regulatory agencies. Mitigation measures are included below that will ensure that potential disturbances to biological resources result in less than significant impacts.

On a long-term basis, all practices provide for improved aquatic, riparian, and/or upland habitat and decreased sedimentation in waterbodies that benefit fish, amphibians, reptiles, resident and migratory birds, and many other species. For example, the stream channel stabilization practice will result in an increased number of deep pools that aquatic animals, including the California red-legged frog and salmonids, require to survive the long, dry California summers. Practices that enhance riparian vegetation and development of habitat values, including critical area planting, filter strips, fish stream

improvement, stream channel stabilization, and streambank protection, will provide shelter from predators and breeding, rearing, foraging, and basking sites for special status species known to occur in the watersheds.

Control of erosion and polluted runoff will improve the quantity and quality of freshwater input into the creeks, streams, and ponds. Removal and control of non-native plant species will reduce the extent to which exotics invade habitat and displace native flora. The net conservation benefits that will result from implementation and maintenance of the conservation practices for species include high quality aquatic, riparian, and upland habitat values, reduced habitat fragmentation and increased connectivity, maintaining or increasing species populations, and buffering sensitive areas.

The Marin Coastal Watersheds Permit Coordination Program will receive a Biological Opinion from U.S. Fish and Wildlife Service (Contact: Cecilia Brown, Sacramento Office) and from NOAA Fisheries (Contact: Dan Logan, Santa Rosa Office). When deemed necessary by the regulators, an Incidental Take Statement will be obtained to cover specific project activities that may result in take of a protected species. All conditions contained in such a permit are deemed part of the mitigation measures herein and will be included in the contracts between the RCD and the cooperator.

a) Protection of Species Identified as Candidate, Sensitive, or Special Status Species in Local or Regional Plans, Policies, or Regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service

Special status species with potential to occur in the program area are shown in the table below. Discussion of specific mitigation measures to avoid or minimize impacts to protected species follows.

Table 4: Listed Animal and Fish Species with Potential to Occur in the Marin Coastal Watersheds Program Area

Common Name	Scientific Name	Federal Status
steelhead	*Oncorhynchus mykiss*	T
coho salmon	*O. kisutch*	T
Chinook salmon	*O. tshawytscha*	T
California red-legged frog	*Rana aurora draytonii*	T
California freshwater shrimp	*Syncaris pacifica*	E
northern spotted owl	*Strix occidentalis caurina*	T
showy Indian clover	*Trifolium amoenum*	E
yellow larkspur	*Delphinium luteum*	E
Baker's larkspur	*D. bakeri*	E
Tiburon paintbrush	*Castilleja affins*	E
Marin dwarf flax	*Hesperolinon congestum*	T
Sonoma alopecurus	*Alopecurus aequalis var. sonomomensis*	E
robust spineflower	*Chorizanthe robusta var. robusta*	E

Mitigation Measures to Avoid or Minimize Impacts to Protected Salmonids during Implementation of Conservation Practices

On a long-term basis, all of the practices provide for improved surface water quality and decreased fine sedimentation in waterbodies, which will improve habitat for salmonids. For example, practices that stabilize existing sediment sources and plant new riparian vegetation (such as critical area planting, filter strip, and streambank protection) will provide shading that may contribute to localized decreases in water temperature. Control of erosion from private lands will improve the quantity and quality of freshwater input to creeks, streams, and ponds, thereby improving aquatic habitat for fish and benthic organisms.

Adult salmonids require clean spawning gravels, pool holding and resting habitat, and sufficient stream flow for upstream passage. In the Marin coastal watersheds, many of the creeks have been steeply downcut or loaded with fine sediments. Sand in gravels can cause gravels to become embedded. Some sands will react with the water and substrate, resulting in a cementing of the gravels, which forms a tough veneer of hardened substrate that makes spawning difficult and spawning success poor. Sand can infiltrate into the spaces between the gravels and reduce the intergravel flow of water, thereby reducing egg survival or making emergence of fry from the gravel extremely difficult.

Installation of these conservation practices will result in improvement of salmonid habitat through reduction of erosion and the amount of fine sediments entering into streams and creeks. Livestock access to watercourses will be limited, which will result in an improvement in water quality. Planting of riparian vegetation will provide shade and cooler water temperatures. Fish stream improvement will create needed pool and riffle stream characteristics.

Protected Salmonids Known to Occur in the Action Area

- Coho Salmon

Coho are currently known to spawn in the program area but only within the Lagunitas Creek watershed. Each year approximately 500 adult male and female coho return to the Lagunitas Creek watershed to spawn the next year. In poor years, as few as 100 fish have returned. The population represents approximately 10% of California's native coho population. Coho move from the ocean into the Lagunitas Creek watershed from November to January. However, spawning was observed in mid-October in 2000. Once hatched, juveniles will seek protective cover near woody debris, large boulders, and root wads. They live in the protective cover for 14-16 months. After 16 months, the juvenile smolts begin their downstream migration at night in the spring peaking in May. After reaching saltwater and undergoing physiological adaptations, they remain in the ocean for 16-18 months before returning to Lagunitas Creek.

- Steelhead Trout

Steelhead trout have been reported in Walker and Stemple Creeks, but the historic population in Stemple Creek is believed to be extirpated. The Lagunitas Creek run is healthier than in most other central California streams. The Walker Creek run sees

variation from year to year, but steelhead can be observed most years in the mainstem and lower portions of tributaries where barriers to passage do not exist.

- Chinook Salmon

Chinook are occasionally sighted in the Lagunitas Creek watershed. Over the last few years 10-20 Chinook annually spawn in this creek system. As of November 19, 2001, there were 2-3 Chinook (one of which was a large 20 pounder) along with 12 coho in a deep pool waiting for more rains to come. Approximately 11 Chinook nests, known as "redds," and 15 fish were seen in October/November 2001. Surprisingly, some were even seen spawning in the creek prior to the first rain event of the season, which dropped 1.25 inches on October 30, 2001. Apparently they are able to get at least part way upstream in shallow water conditions. Fish were found as far up as the Leo Cronin Viewing Area just upstream of Samuel P. Taylor Park and in San Geronimo Creek. Local researchers have documented a handful of Chinook each year since 1995-96 (the first year they started conducting surveys). Biologists have so far counted 318 redds in the creeks and tributaries, including an unprecedented 27 of Chinook.

Another 84 redds were counted in Olema Creek, a tributary that joins Lagunitas Creek near its confluence with Tomales Bay.

Specific Actions to Avoid or Minimize Impacts to Salmonids

As part of Marin Coastal Watersheds Permit Coordination Program, the following mitigation measures will be followed to ensure protection of salmonids:

- Prior to each construction season, RCD/NRCS will submit to NOAA Fisheries and DFG a summary of proposed projects with details on construction techniques, stream conditions at time of work, and proximity and connectivity to known habitat.

- RCD/NRCS shall meet with NOAA Fisheries staff and DFG's local wildlife and fisheries biologists in June of each year to review the individual projects. The purpose of this meeting is to determine if take is likely to occur. NOAA Fisheries and DFG may provide additional conditions on the projects where take may occur. Such conditions shall be included in a memo from the RCD/NRCS to the agencies, to be confirmed in writing within 60 days. RCD/NRCS shall include those conditions as part of the project plan and contracts with the cooperator.

- If unforeseen circumstances arise in project implementation that may lead to adverse effects to steelhead, coho salmon, Chinook salmon, or their habitat, operations will cease immediately and DFG and NOAA Fisheries will be contacted.

- In specific cases where it is deemed necessary to work in a flowing stream or creek, the work area shall be isolated, and all flowing water temporarily diverted around the work site to maintain downstream flows during construction. When construction is completed, the flow diversion structure shall be removed in a manner that will allow flow to resume with the least disturbance to the substrate. Fish shall not be trapped or isolated by the diversion structure. [DFG GC3]

- A qualified biologist will be present on site during dewatering and removal or decommissioning of the temporary diversion and as needed to protect sensitive aquatic resources during project construction. The RCD/NRCS, in consultation with the NOAA Fisheries and/or DFG, will determine the expertise needed by the monitor. For some projects, a qualified individual approved by NOAA Fisheries and/or DFG shall work with the species in question.

- RCD/NRCS projects that do not qualify for the permit coordination program (either because they use practices other than the 16 listed practices or cannot meet the size limits or permit conditions) shall use the traditional permit mechanism wherein the cooperator is responsible for obtaining permits for the proposed work.

Mitigation Measures to Avoid or Minimize Impacts to Other Protected Species during Implementation of Conservation Practices

As part of Marin Coastal Watersheds Permit Coordination Program, the following mitigation measures will be followed to ensure protection of other protected species:

Communication with U.S. Fish and Wildlife Service (FWS)

- RCD/NRCS will submit to FWS at the beginning of each construction season a summary of proposed projects with details on construction techniques, stream conditions at time of work, and proximity and connectivity to known habitat.

- FWS may provide additional conditions on the projects where take may occur. Such conditions shall be included in a memo from the RCD/NRCS to the agencies, to be confirmed in writing within 60 days. RCD/NRCS shall include those conditions as part of the project plan and in the individual contracts with the cooperator.

- If unforeseen circumstances arise in project implementation that may lead to adverse effects to the named species or their habitat, operations will cease immediately and FWS will be contacted.

- Projects that do not qualify for the permit coordination program (either because they use practices other than the 16 listed practices or cannot meet the size limits or permit conditions) shall use the traditional permit mechanism wherein the cooperator is responsible for obtaining permits for the proposed work.

Specific actions to avoid or minimize impacts to the California freshwater shrimp

- RCD/NRCS staff will conduct reconnaissance-level surveys to determine if suitable habitat for California freshwater shrimp occurs in the program area. No activities will be conducted in channels with flowing or standing water within potential shrimp habitat.
- Project activities will avoid removal of or damage to overhanging vegetation along stream channels.

- Overhanging banks within potential shrimp habitat will remain undisturbed.
- Project activities requiring heavy equipment will occur only between June 15 and October 15 and will not occur during rainfall.
- No rock structures will be constructed in channel bottoms that may interfere with shrimp migration between in-channel pools; this includes rip-rap for bank stabilization.
- Animal trails and walkways will not be constructed in freshwater shrimp habitat.

Specific actions to avoid or minimize impacts to the California red-legged frog

- RCD/NRCS staff will conduct reconnaissance-level surveys to determine if suitable habitat for California red-legged frog (CRLF) occurs within the program area.
- If the project site occurs in potential red-legged frog habitat, a qualified biologist approved by the FWS will conduct a pre-construction survey no more than 48 hours before the start of construction activities. The biologist will look for species, evaluate the likelihood of usage, and determine if additional biological monitoring is needed during construction to ensure that individuals present will be removed or avoided.
- If CRLF are observed during pre-construction inspections, FWS will be contacted before work activities begin for technical assistance, determination if additional protection measures are needed, and assistance in selecting locations for suitable release sites up- or downstream of the project site.
- Projects within potential CRLF habitat will be designed to minimize disturbance to vegetation near or in permanent and seasonal pools of streams, marshes, ponds, or shorelines with extensive emergent or weedy vegetation.
- All construction within stream channels will take place during daylight hours.
- If suitable habitat is present, project activities will begin after July 1 to avoid impacts to breeding CRLF adults or egg masses.
- If monitoring during construction is needed, a FWS-approved biologist will have the authority to halt work activities that may adversely affect CRLF until they can be moved out of the project area.
- Translocation of CRLF will be performed only by individuals approved in advance by FWS.

Specific actions to avoid impacts to Northern Spotted Owl

- RCD/NRCS staff will conduct reconnaissance-level surveys to determine if suitable habitat for Northern spotted owl (NSO) habitat occurs within 0.25 mile of the proposed work area. The indicators of potential NSO habitat are:
    - Any coniferous forest stand with trees greater than 11” diameter at breast height AND total canopy closure greater than 40%

Or

- One or more large, residual, old growth trees.

- If habitat is known to occur and the absence of NSO cannot be verified, RCD/NRCS shall assume the species is present. Under these circumstances, RCD/NRCS shall either 1) perform work after July 31 or 2) implement sound reduction measures to ensure that activities do not significantly raise noise above ambient levels. These measures can include, but are not limited to, laying a bed of sand before unloading gravel or rock from a truck and/or disabling "back-up beepers" on equipment.

Actions to avoid impacts to listed plant species

- RCD/NRCS staff will conduct reconnaissance-level surveys to determine if suitable habitat for listed plant species is present within the work area. If suitable habitat exists or if a listed species is found, a qualified biologist will identify and evaluate the characteristic habitats.
- If the project area supports listed plant species, the plants will not be disturbed.
- When listed plant species are found in a project area, a buffer zone of 20 feet will be established around the plants to avoid impacts.
- No fertilizers will be used in the 20-foot buffer zone to hasten or improve the growth of plantings associated with the project.

b) Protection of Riparian Habitat or other Sensitive Natural Communities

Restoration of riparian habitats is central to the purpose of the program. The conservation and restoration practices will improve both the quantity and quality of riparian habitat. Practices that enhance the riparian habitat and vegetation include critical area planting, pipeline installation, fish stream improvement, streambank protection, and stream channel stabilization. These practices improve the quality of riparian habitat by stabilizing eroding soils, preventing cattle from grazing in riparian areas, and managing sources of erosion that can occur in riparian areas.

The conservation practices are designed to avoid and/or minimize disturbance to riparian areas. Specific mitigation measures required by the RCD/NRCS MOA with DFG include:

- Except with approval from DFG staff, there shall be no cutting or removal of native trees 4" or greater diameter at breast height (dbh), except willows, for which there shall not be cutting or removal of trees 6" or greater dbh. For any permitted removal of any native tree, the root structure of the tree shall be left intact unless authorized by DFG staff. [DFG GC10]

- No more than 0.10 acres of native riparian shrubs or woody perennials shall be removed from a stream area. Where the area contains a mix of native and invasive species, up to 0.25 acres may be removed from a streambank or stream channel. If the area is exclusively non-native plants, up to 5 acres of riparian vegetation may be removed. Any area cleared of vegetation must be revegetated

with native plant species. Non-invasive, non-persistent grass species (i.e., barley grass) may be used in conjunction with native species to provide fast establishing, temporary cover for erosion control. [DFG GC6]

- Any streambank area left barren of vegetation as a result of the implementation or maintenance of the practices shall be restored to a natural state by seeding, replanting, or other agreed upon means with native trees, shrubs, and/or grasses prior to October 15 of the project year. Work beyond the time frame may be authorized following consultation with and approval of the local DFG biologist, provided it could be completed prior to first flows. Barren areas shall typically be planted with a combination of willow stakes, native shrubs and trees and/or erosion control grass mixes. [DFG GC7]

c) Protection of Wetlands

One of the long-term beneficial effects of the program is improvement of wetlands in the watersheds. The permit coordination program will be authorized under the federal Clean Water Act by the U.S. Army Corps of Engineers through Nationwide Permit (NWP) NWP 13 (Bank Stabilization) and/or 27 (Stream and Wetland Restoration Activities). The applicable terms of those permits are contained in Appendix 4 and 5, respectively. NWP 27 has been annotated to exclude activities not authorized by this program. Although project implementation will utilize NWP 27(a)(1), which in the conventional permitting process does not require notification to the Corps, work in wetlands and other waterbodies under this permit coordination program will require notification to all regulatory agencies, including the Corps. NWP 27 conditions that allow relocation of tidal and non-tidal wetlands and reversion are specifically excluded from the program.

The conservation practices can be used to restore natural wetland functions, to stabilize erodible soils to prevent soil accumulation in wetlands, to collect sediments before they enter waterways and wetlands, and to provide watering areas for livestock away from sensitive habitats. The RCD/NRCS conservation planning process uses the California Environmental Assessment Worksheet to determine effects on wetlands. (The RCD/NRCS planning documents are provided in the Appendix to this document.)

Only projects that result in a net environmental benefit are included in this program. Short-term impacts to wetlands, such as soil excavation or grading, preparation of the ground for seeding and mulching, grade and stream stabilization, channel excavation, construction of earthen embankments, placement of fill, vegetation removal, and burial, trampling, or crushing of vegetation from equipment and foot traffic, will be mitigated by improved water quality and wetland habitat values as a result of project installation. Projects in tidally-influenced wetlands and waters or in vernal pools are not included in the permit coordination program.

d) Movement of Native or Migratory Fish or Wildlife

This program seeks to improve habitat for migrating fish, specifically coho salmon, Chinook salmon, and steelhead trout, which are listed as threatened by NOAA Fisheries. This project program is being reviewed by the agency through a Section 7 Consultation with the RCD and NRCS. By reducing the contribution of sediments to the waterways and improving aquatic and riparian habitat, the project program is designed to have an overall net benefit to movement of native and migratory fish. By increasing habitat connectivity, the program will result in improved aquatic, riparian, and upland movement

opportunities for many species. Measures to reduce and minimize potential impacts during construction have been incorporated into the project design using guidance from DFG, NOAA Fisheries, and FWS biological staff.

Temporary Diversions and Dewatering Requirements

In specific cases where it is deemed necessary to work in a flowing stream or creek, the work area shall be isolated, and all flowing water temporarily diverted around the work site to maintain downstream flows during construction. When construction is completed, the flow diversion structure shall be removed in a manner that will allow flow to resume with the least disturbance to the substrate. Fish shall not be trapped or isolated by the diversion structure. [DFG GC3] A qualified biologist will be present on site during dewatering and removal or decommissioning of the temporary diversion and as needed to protect sensitive aquatic resources during project construction. The RCD/NRCS, in consultation with FWS, NOAA Fisheries, and/or DFG, will determine the expertise needed by the monitor. For some projects, a qualified individual approved by FWS, NOAA Fisheries, and/or DFG shall work with the species in question.

e) Avoiding Conflict with Local Policies or Ordinances

The program has been reviewed for consistency with the following local ordinances:

1. Marin County Local Coastal Plan
2. Marin County Zoning Ordinance
3. Marin County General Plan
4. National Park Service General Plan

f) Conflict with Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other Approved Local, Regional, or State Habitat Conservation Plan.

The program has been reviewed and determined to be consistent with adopted Habitat Conservation Plans, Natural Community Conservation Plans, and other approved local, regional, or state habitat conservation plans. Currently, no Natural Community Conservation Planning efforts are known to be underway in the program area.

Finding: Less than significant impact with mitigation incorporated.

V. CULTURAL RESOURCES -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	☐	☐	☐	X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☐	☐	X

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	X
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	X

Discussion of Cultural Resources

RCD and NRCS policies (General Manual 420, Part 401) ensure that the effects of conservation activities on historic properties are considered in the earliest planning stages and that cultural resource protection is accomplished as efficiently as possible. As with all RCD/NRCS conservation projects, including those covered by the permit coordination program, the RCD/NRCS identifies, examines, considers, and avoids potential impacts to cultural resources. Any conservation or restoration activities that would cause an adverse impact on cultural resources do not qualify for the Marin Coastal Watersheds Permit Coordination Program. All projects implemented under this program operate under 36 CFR 800.

Finding: No impact.

VI. GEOLOGY AND SOILS -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	X
ii) Strong seismic ground shaking?	☐	☐	☐	X
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	X
iv) Landslides?	☐	☐	☐	X

b) Result in substantial soil erosion or the loss of topsoil?	☐	x	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	x
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	x
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	x

Discussion of Geology and Soils

The risk of slope failure, liquifaction, or structural failure is addressed during the planning process. The RCD's federal partner, NRCS (formerly the Soil Conservation Service), produces the Soil Survey of Marin County and specializes is soil science interpretations. NRCS engineers consider soil physical factors when selecting and designing conservation measures. The RCD/NRCS planning process and policies require all projects to be evaluated for soil hazards and mitigated if appropriate. The RCD/NRCS do not work in areas of known geologic instability without approval of a certified engineer. Therefore, there is no potential for a negative impact to geology or soils.

Best management practices will be utilized during construction to prevent soil loss and polluted runoff (see discussion in the Environmental Protection and Mitigation Measures section above). For example, when implementing or maintaining a critical area planting above the high water line, a filter fabric fence, fiber rolls and/or hay bales shall be utilized, if needed, to keep sediment from flowing into the adjacent waterbody. Annual review by RCD/NRCS shall occur until the critical area planting is established to control erosion. [DFG C1]

Every conservation practice covered by this program has been determined by the RCD and its federal partner, the NRCS, to have a net environmental benefit observable in the first year after construction. Projects to be implemented under the Marin Coastal Watersheds Permit Coordination Program have the stated purpose of reducing or eliminating soil erosion. The conservation projects are designed to minimize impacts during construction. Thus, any contributions of sediments from construction are offset within the first year by the functioning of the conservation practice.

Finding: Less than significant impact with mitigation incorporated.

VII. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	X
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	X	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	X

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	x
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	x

Discussion of Hazards and Hazardous Materials

Conservation actions with the potential to release hazardous materials into waterways are not covered by the program. Some use and storage of construction equipment at the site during the implementation of the practices will occur during implementation of the conservation and restoration practices. The RCD and NRCS shall ensure that adverse impacts do not occur during routine operations by implementing the following limitations on construction equipment and potentially hazardous materials:

- Use of heavy equipment shall be avoided in a channel bottom with rocky or cobbled substrate. If access to the work site requires heavy equipment to travel on a rocky or cobbled substrate, a rubber tire loader/backhoe is the preferred vehicle. Only after this option has been determined impossible will the use of tracked vehicles be considered. [DFG GC5]
- The amount of time heavy equipment is stationed, working, or traveling within the creek bed shall be minimized. [DFG GC5]
- When heavy equipment is used, woody debris and vegetation on banks and in the channel shall not be disturbed if outside of the project's scope. [DFG GC5]
- Heavy equipment shall not be used in a flowing stream, creek, or ponded area, except to cross a stream or pond to access the work site. [DFG GC5]
- No work shall occur in flowing or standing water, or in permanent or seasonally ponded areas except as described in DFG Section E, "Special provisions for implementation and maintenance of Grade Stabilization, Structure, Streambank Protection and Stream Channel Stabilization." [DFG GC3] Section E protection measures include:
  - Construction and maintenance of grade stabilization structures in streams or creeks that support a salmonid fishery shall be the subject of a specific Agreement under Fish and Game Code 1600 et seq., and are not part of this program.
  - No chemically-treated timbers shall be used for grade or channel stabilization structures, bulkheads, or other in-stream structures.
  - Sediment removal from the stream channel or ponds may occur if it will improve biological functioning of the stream and restore channel capacity

[DFG E4]. Measures to control upslope sediment sources will be implemented where feasible and access allows.

  - Sediment removal may not occur in a flowing stream or standing water.

- No gabions, grouted rock, or concrete will be used in any waterway (fish-bearing or non fish-bearing) for grade stabilization, stream channel stabilization, streambank protection, or fish stream improvement projects. [SFBRWQCB]
- In specific cases where it is deemed necessary to work in a flowing stream/creek, the work area shall be isolated, and all flowing water shall be temporarily diverted around the work site to maintain downstream flows during construction. When construction is completed, the flow diversion structure shall be removed in a manner that will allow flow to resume with the least disturbance to the substrate. [DFG GC3]
- RCD shall schedule excavation and grading activities for dry weather periods (see discussion in Temporal Limitations on Construction section above).
- The use or storage of petroleum-powered equipment shall be accomplished in a manner to prevent the potential release of petroleum materials into waters of the state (Fish and Game Code 5650). [DFG GC11] The following precautionary measures will be followed:
  - If needed, a contained area located at least 50 feet from a watercourse will be designated for equipment storage, short-term maintenance, and refueling. If possible, these activities will not take place on the project site.
  - Areas where fuel or hazardous materials are stored at the project site shall be provided with secondary containment in the form of an earthen berm or other engineered revetment. The area contained by the berm shall be sufficient to contain all fluids stored within the berm.
  - Vehicles shall be inspected for leaks and repaired immediately.
  - Leaks, drips and other spill are cleaned up immediately to avoid soil or groundwater contamination.
  - Clean up of leaks or spills shall be performed to the satisfaction of the Regional Board in a time frame satisfactory to the Regional Board.
  - Major vehicle maintenance and washing shall be done off site.
  - All spent fluids including motor oil, radiator coolant, or other fluids and used vehicle batteries shall be collected, stored, and recycled as hazardous waste off site.
  - Dry cleanup methods (i.e. absorbent materials, cat litter, and/or rags) shall be used whenever possible. If water is used, the minimal amount required to keep dust levels down shall be used.
  - Spilled dry materials shall be swept up immediately.
- All construction debris and sediments shall be taken to appropriate landfills or in the case of sediments, disposed of away in upland areas or off-site.
- When possible, RCD/NRCS shall use existing ingress or egress points.

The use of pesticides, herbicides, and chemical fertilizers shall be limited as follows:

- No pesticides, with the exception of or herbicides application as described below to control established stands of exotics or to control the invasion of exotics into restoration plantings, shall be used as part of the permit coordination program.
- No herbicides shall be used where threatened or endanger species occur.
- In general, hand labor shall be used to control exotic vegetation at the site. Under extreme circumstances and with regulatory approval, herbicides may be applied to control established stands of non-native species. Application shall be compliant with the California Department of Pesticide Use regulations in accordance with Material Safety Data Sheets, Marin County Agriculture Commission's Weed Management Plan, manufacturer's instructions, and/or under the guidance of a registered pesticide advisor.
- Where it is necessary to use herbicides to control established stands of exotics or to control the invasion of exotics into restoration plantings, the herbicides must be applied by hand by a licensed applicator in accordance with manufacturer's recommendations and registered label conditions. Herbicides must be applied directly to plants and may not be spread upon any water or where they can leach into waterways in subsequent rains. [DFG C2] Application shall occur in a manner that minimizes drip and drift into the water and only on calm days (wind less than 5 miles per hour) to prevent airborne transfer of herbicide.
- In riparian environments, an herbicide (with or without a surfactant) that has been registered for use in an aquatic environment (i.e., Rodeo™) and on target vegetation will be utilized. No broadcast spraying will occur. Great care shall be taken to avoid contact with native species.
- On National Park Service lands, herbicides will be applied using backpack sprayers in accordance with National Park Service Integrated Pest Management regulations and California Department of Pesticide Use regulations in accordance with Material Safety Data Sheets. No foliar spraying is allowed in riparian habitats. Any proposed herbicide ground spraying within 100 feet of a creek are not included in the permit coordination program. During the dry season (July 1 to November 15), select stumps of non-native trees and shrubs within riparian zones may be treated by painting herbicides. [NPS]
- Organic amendments shall be used to ensure successful establishment of restoration vegetation associated with the practices.
- Organic fertilizers may be used above the normal high water mark the year of planting, if necessary. No chemical fertilizers shall be used. [DFG C2]

Finding: Less than significant impact with mitigation incorporated.

VIII. HYDROLOGY AND WATER QUALITY -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	X
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	X	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	X
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	X
f) Otherwise substantially degrade water quality?	☐	☐	X	☐
g) Place housing within a 100-year	☐	☐	☐	X

flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	x	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	x
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	x

Discussion of Hydrology and Water Quality

Design criteria, implementation, and maintenance of the RCD/NRCS conservation practices are specific to the hydrologic conditions of the Marin coastal watersheds. The conservation practices selected for coverage by this permit coordination program have a proven ability to result in improvement in hydrology and water quality. They are specifically designed to stem and resolve erosion and sediment problems, to minimize polluted runoff from agriculture, including nutrients, fertilizers, and pesticides/herbicides, and to be installed in such a manner that there is low to no risk of causing environmental impacts. Best management practices and erosion control measures are utilized both during construction and in the permanent erosion control measures to avoid adverse impacts to adjacent watercourses, hydrology, and water quality.

The mitigation measures incorporated as conditions of the §1600, et seq., Streambed Alteration Agreement MOA with DFG require that any potentially significant impacts to water quality during construction be avoided or reduced to below a level of significance. The permit requires that construction or maintenance activities for the conservation practices not result in increases in turbidity in the stream (as measured by Nephelometric Turbidity Unit (NTU)) of more than 10% of the upstream background. [DFG B1] Implementation and maintenance of best management practices for stormwater pollution prevention will ensure that construction-related pollutants of concern, such as sediment and petroleum products, do not adversely affect water quality.

a) Adherence to Water Quality Standards or Waste Discharge Requirements

The conservation practices included in the program will adhere to water quality standards and the programmatic federal Clean Water Act §401 Conditions or Waste Discharge Requirements. Typical examples of waste discharge prohibitions from the North Coast and San Francisco Bay Regional Water Quality Control Boards that will apply to installation of the conservation practices include, but are not limited to, the following:

- Discharge of storm water from a facility or activity that causes or contributes to the violation of water quality standards or water quality objectives (collectively Water Quality Standards) is prohibited.

- Creation of a condition of pollution, contamination, or nuisance, as these terms are defined in California Water Code Section 13050(d), is prohibited.

- Discharge of soil, bark, slash, sawdust, or other organic and earthen material from any construction or associated activity of whatever nature into any stream or watercourse in quantities deleterious to fish, wildlife, or other beneficial use is prohibited.

- Placing or disposal of soil, silt, bark, slash, sawdust, or other organic material from any construction or associated activity of whatever nature at locations where such material could pass into any stream or watercourse in the basin in quantities that could be deleterious to fish, wildlife, or other beneficial uses is prohibited.

- Discharge of decant water from any on-site temporary sediment stockpile or storage areas or any other discharge of construction dewatering flows to surface waters outside of the active dredging site is prohibited.

- Maintenance activities that result in the direct or indirect discharge of waste, other than that authorized by this Order, as described in Section 13050(d) of the California Water Code, to surface waters or surface water drainage courses are prohibited unless authorized by separate permit action.

Compliance with prohibitions provided by the local Regional Water Quality Control Boards will mitigate any potential adverse water quality impacts.

b) Groundwater

The Marin Coastal Watersheds Permit Coordination Program will not result in depletion of groundwater. Some conservation and restoration activities (such as installation of grade stabilization structures, in-stream and channel restoration work, stream channel stabilization work, restoration work relating to road stream crossings, and water control structures) may result in minor, short-term changes in the course and direction of surface water movement during construction, which could have a temporary, minor adverse impact on the local groundwater level. However, all listed conservation and restoration activities are designed to enhance both soil and water conditions, providing higher ecological functioning in the watershed, and, therefore, long-term impacts are expected to be highly beneficial.

c) Drainage Patterns and Erosion

Although there may be some short-tem changes in the course or direction of water movement in fresh waters, there will be an overall improvement to hydrology and water quality in the program area. The grade stabilization structure practice involves reduction of stream velocity above and below the structure on a temporary basis to control grade. Improvements to existing farm and ranch roads through the access roads practice will redirect runoff from roads into safer outlets using water bars and/or outsloping.

d) Drainage Patterns and Flooding

Rainfall and irrigation runoff and downstream flooding will be reduced as a result of implementation and maintenance of the conservation practices. The RCD and NRCS compute hydrologic runoff estimates for existing land use and management prior to selecting conservation practices. The practices are designed to reduce runoff to the natural background level that would have occurred on the property prior to development of agricultural operations or impervious surfaces. These design objectives are achieved either through improved infiltration or through detention of peak flows. Infiltration is improved through the use of increased vegetative cover of bare soils (critical area planting, filter strips, grassed waterways) and improved agricultural soil and crop management.

Work along watercourses covered by this program will promote the use of biotechnical streambank protection. These practices increase the roughness of streambanks, thereby slowing the rate of discharge into downstream watercourses. Localized flooding associated with slower discharge would be avoided by increasing the cross-sectional area of the channel or providing for a flood flow terrace as part of the design. Stream channel stabilization that involves sediment removal will increase the capacity of the channel, thereby reducing localized flooding. All work in stream channels will involve the use of NRCS hydrological and engineering procedures and manuals.

e) Runoff and Stormwater Drainage

See discussion in Sections a, c, and d above.

f) Degradation of Water Quality

One of the stated purposes of the program is improvement in water quality. No project will be implemented that will result in long-term degradation. Construction or maintenance activities for the conservation practices shall not result in increases in turbidity in the stream (as measured by Nephelometric Turbidity Unit (NTU)) of more than 10% of the upstream background. [DFG G4]

g) Housing in the Floodplain

No housing construction is authorized as part of this program.

h) Placement of structures in the 100-year flood hazard area which would impede or redirect flood flows.

Only vegetative or rock structures designed to stabilize erosion will be placed in 100-year flood hazard areas. Most of these structures run parallel to watercourses and, therefore, do not pose a risk for redirecting flows away from the flood hazard area. Placement of structures that would impede flood flows is not authorized by this program.

i) Flood Risk

Failure of structures included in the permit coordination program poses little to no risk to life and property due to their small size and placement in rural agricultural areas. Levees and dams are not authorized by this permit coordination program. The water and sediment control basin practice can be used to reduce concentrated off-site flow and associated erosion by metering out runoff following large storm events.

j) Inundation by seiche, tsunami, or mudflow
The conservation and restoration projects of the Marin Coastal Watersheds Permit Coordination Program do not pose a threat of causing and inundation by seiche, tsunami, or mudflow, or being inundated.

Finding: Less than significant impact with mitigation incorporated.

IX. LAND USE AND PLANNING - Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	X

Discussion of Land Use Planning
Not applicable to this project. The program will not alter existing land uses. However, it is anticipated that installation of the conservation and restoration practices will result in increased agricultural sustainability. Further, water quality improvements are expected to benefit recreation, commercial shellfish production, and commercial and recreational fishing.

Finding: No impact.

X. MINERAL RESOURCES -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	X

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	X

Discussion of Mineral Resources
Not applicable to this program.

Finding: No impact.

XI. NOISE -- Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	X
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	X	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	X
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	X	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	X

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	X

Discussion of Noise

Temporary ambient noise levels in the project vicinity will not exceed existing noise generated by common agricultural management. Many ranchers currently use earthmoving equipment to retrieve eroded soil, smooth eroded landscape features, and conduct routine agricultural cultivation. It is expected that many of the project activities will reduce erosion and loss of soil and the need for noisy clean-up operations.

Finding: Less than significant impact.

XII. POPULATION AND HOUSING -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	X

Discussion of Housing

The Marin Coastal Watersheds Permit Coordination Program will not directly or indirectly induce population growth, displace any existing housing or job supply. The project sites will be located in rural, agricultural areas.

Finding: No impact.

XIII. PUBLIC SERVICES	Less Than Significant

	Potentially Significant Impact	with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	X
Police protection?	☐	☐	☐	X
Schools?	☐	☐	☐	X
Parks?	☐	☐	☐	X
Other public facilities?	☐	☐	☐	X

Discussion of Public Services
The Marin Coastal Watersheds Permit Coordination Program will not require any additional public services nor new governmental facilities.

Finding: No impact.

XIV. RECREATION

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	X
b) Does the project include recreational facilities or require the construction or expansion of	☐	☐	☐	X

recreational facilities which might have an adverse physical effect on the environment?

Discussion of Recreation

The Marin Coastal Watersheds Permit Coordination Program will not increase the use of any recreational facility, nor will it include the construction or expansion of such facilities.

Finding: No impact.

XV. TRANSPORTATION/TRAFFIC -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	X	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	X
e) Result in inadequate emergency access?	☐	☐	☐	X
f) Result in inadequate parking capacity?	☐	☐	☐	X

g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	X

Discussion of Transportation and Traffic

Additional traffic associated with project construction is likely; however, the increase will be minor, temporary, and not exceed the capacity of the road system. The proposed conservation activities will reduce or eliminate many threats to traffic safety such as sediment on roads, plugging of road culverts, and associated localized flooding. By reducing the likelihood of these traffic hazards, there will be less need for County Public Works crews and equipment to be on the roads to clean up sediment and flooding problems.

Finding: Less than significant impact.

XVI. UTILITIES AND SERVICE SYSTEMS -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	X
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	X
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	X
e) Result in a determination by the wastewater treatment provider which	☐	☐	☐	X

serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	X
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	X

Discussion of Utilities and Service Systems

The Marin Coastal Watersheds Permit Coordination Program will not create wastewater, nor will it require wastewater treatment facilities. While impacts from stormwater are addressed by approvals issued by the Regional Water Quality Control Board, the program does not require the construction of new stormwater drainage facilities or the expansion of such facilities. The program does not require new water supplies. Waste materials may be taken to appropriate landfills. Such disposal would constitute a tiny fraction of any landfill capacity and would have no impact on landfill capacity.

Finding: No Impact.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	X	☐	☐
b) Does the project have impacts that are individually limited, but	☐	☐	X	☐

cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	x	☐

Discussion of Mandatory Findings of Significance

The Marin Coastal Watersheds Permit Coordination Program will not degrade the quality of the environment, substantially reduce habitat for fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. Such a potential does not exist because the program will be implemented in such a manner as to avoid short-term impacts to sensitive resources. The program has no potential to adversely impact cultural resources or human beings. The program does not have the potential for adverse cumulative impacts. The program will result in improvement in water quality, natural habitat functioning, and agricultural sustainability.

Finding: Less than significant impact.

APPENDICES

APPENDIX 1: PROJECT PLANNING DOCUMENTS

Checklist of Resource Problems or Conditions

Site-specific Practices Effects Worksheet

Resource Management System (RMS) Guidesheet

Conservation Effects Treatment Options Worksheet

Conservation Plan and Environmental Assessment Worksheet

CHECKLIST OF RESOURCE PROBLEMS OR CONDITIONS

Business Name: _____ Tract/Land Unit: _____

NRCS Client Land Use: _____ Management System Label: __

ANSWER ALL ITEMS AND DESCRIBE EACH YES ANSWER:

	Y/N	DESCRIPTION OF CONDITION
A.1.- Soil Erosion		
a. Sheet and Rill Erosion - USLE or RUSLE		_____ Tons/Acre/Year
a. Sheet and Rill Erosion - Narrative Entry	_____	_____
b. Wind Erosion - WEQ or RWEQ		_____ Tons/Acre/Year
b. Wind Erosion - Narrative Entry	_____	_____
c. Ephemeral Gully - Numeric (Tons/Year)		_____ Tons/Year
c. Ephemeral Gully - Numeric (Acres Affected)		_____ Acres
c. Ephemeral Gully- Narrative Entry	_____	_____
d. Classic Gully- Numeric (Tons/Year)		_____ Tons/Year
d. Classic Gully - Numeric (Acres Affected)		_____ Acres
d. Classic Gully - Narrative Entry	_____	_____
e. Streambank Erosion - Numeric (Tons/Year)		_____ Tons/Year
e. Streambank Erosion - Numeric (Acres Affected)		_____ Acres
e. Streambank Erosion - Narrative Entry	_____	_____
f. irrigation Induced Erosion - Numeric (Tons/Year)		_____ Tons/Year
f. Irrigation Induced Erosion - Numeric (Acres Affected)		_____ Acres
f. Irrigation Induced Erosion - Narrative Entry	_____	_____
g. Soil Mass Movement- Numeric (Tons/Year)		_____ Tons/Year
g. Soil Mass Movement - Numeric (Acres Affected)		_____ Acres
g. Soii Mass Movement- Narrative Entry	_____	_____
h. Roads, Const., Scoured - Numeric (Tons/Year)		_____ Tons/Year
h. Roads, Const., Scoured - Numeric (Acres Affected)		_____ Acres
h. Roadbanks. Et. Al. Erosion - Narrative Entry	_____	_____
i. Other Soii Erosion - Numeric (Tons/Year)		_____ Tons/Year
i. Other Soil Erosion - Numeric (Acres Affected)		_____ Acres
i. Other Soil Erosion - Narrative Entry	_____	_____
A.2.- Soil Condition		
a. Tilth. Crusting. Infiltration. Organic	_____	_____
b. Soil Compaction	_____	_____
c. Excess Chemicals in Soil (Salinity)	_____	_____
d. Excess Animal Wastes/Organics in Soil	_____	_____
e. Excess Fertilizer in Soil	_____	_____
f. Excess Pesticide(s) in Soil	_____	_____
g. Soil Condition-Other	_____	_____
A.3.- Soil Deposition		
a. Soil Deposition Causing Onsite Damage	_____	_____
b. Soil Deposition Causing Offsite Damage	_____	_____
c. Soil Deposition-Onsite Safety Hazard	_____	_____
d. Soil Deposition-Offsite Safety Hazard	_____	_____
e. Soil Deposition-Other	_____	_____

CHECKLIST OF RESOURCE PROBLEMS OR CONDITIONS

ANSWER ALL ITEMS AND DESCRIBE EACH YES ANSWER:

	Y/N	DESCRIPTION OF CONDITION
B.1.- Water Quantity		
a. Seeps	_____	_____
b. Runoff/Flooding	_____	_____
c. Soil Saturation	_____	_____
d. Inadequate Outlets	_____	_____
e. Irrig. Water Mgmt. - Amount Water Applied		_____ Acre Inches/Acre/Year
e. Irrig. Water Mgmt. - System Efficiency		_____ Percent
e. Irrigation Water Mgmt - Narrative	_____	_____
f. Nonirrigated Water Mgmt	_____	_____
9. Onsite Conveyance Capacity		_____ Acre Inches
a. Onsite Convevance Capacity - Narrative	_____	_____
h. Offsite Conveyance Capacity		_____ Acre Inches
h. Offsite Conveyance Capacity- Narrative	_____	_____
i. Streams/Lakes Conveyance Capacity		_____ Acre Inches
i Streams/Lakes Restricted Capacity- Narrative	_____	_____
i. Water Quantity-Other	_____	_____
B.2. - Water Qualitv - Groundwater - Contaminents		
a Pesticide's) in Ground Water	_____	_____
b. Nitrate-N Leaving Bottom of Root Zone		_____ Lbs/Acre/Year
b. Nitrate-N in Groundwater		_____ Mg/Liter
b. Phosphate-P Leaving Bottom of Root Zone		_____ Lbs/Acre/Year
b. Phosphate-P in Groundwater		_____Mg/Liter
b. Nutrients & Organics in Ground Water	_____	_____
c. Salt in Ground Water	_____	_____
d. Heavy Metals in Ground Water	_____	_____
e. Pathogens in Groundwater	_____	_____
f. Groundwater Pollution Severity		_____ Code (AD-862)
f. Groundwater contaminants - Other	_____	_____
B.2. - Water Qualitv - Surface Water - Contaminants		
9. Pesticide(s) in Surface Water	_____	_____
h. Animal Waste		_____ Tons/Year
h. Nitrate-N Leaving Field		_____ Lbs/Acre/Year
h. Nitrate-N in Surface Water		_____ Mg/Liter
h. Total Kjeldahl N Leaving Field		_____ Lbs/Acre/Year
h. Ammonium-N Leaving Field		_____ Lbs/Acre/Year
h. Solution-P Leaving Field		_____ Lbs/Acre/Year
h. Total Phosphorus Leaving Field		_____ Lbs/Acre/Year
h. Total Phosphorus in Surface Water		_____ Mg/Liter
h. Nutrients & Organics in Surface Water	_____	_____
i. Transparency Secchi Disk Reading		_____ Meters
i. Sediment Yield, Average Annual		_____ Tons/Year
i. Sediment Yield, Storm Event		_____ Tons
i. Storm Event Suspended Sediment Yield		_____ Tons
i. Turbidity in ntu's		_____ ntu
i. Suspended Sediment/Turbid Surface Water	_____	_____

CHECKLIST OF RESOURCE PROBLEMS OR CONDITIONS

ANSWER ALL ITEMS AND DESCRIBE EACH YES ANSWER:

	Y/N	DESCRIPTION OF CONDITION
B.2. - Water Quality - Surface Water - Contaminants		
j. Dissolved Oxygen	_____	_____ Mg/Liter
j. Low Dissolved Oxygen in Surface Water		_____
k. Salt Delivered	_____	_____ Tons
k. Salt in Surface Water	_____	_____
I. Heavy Metals in Surface Water		_____
m. Surface Water Temperature		_____ Degrees C
m. Surface Water Temperature		_____
n. Fecal Coliform Leaving Field		_____ No./100ml
n. Fecal Streptococcus Leaving Field		_____ No./100,;
n. Pathogen(s) in Surface Water		_____
n. Surface Water Pollution Severity		_____Code (AD-862)
n. Surface Water Total Dissolved Solids		_____PPTHousand
n. Surface Water pH		_____pH
n. Surface Water contaminant(s) - Other	_____	_____
B.2. - Water Quality - Aquatic Habitat Suitability		
o. Five-day Biochemical Oxygen Demand		_____ Mg/Liter
o. Stream Fish Population		_____ No./Sq.Mi.
o. Stream Benthic Invertebrates		_____ No./Sq.Mi.
o. Lake/Reservoir Fish Population		_____ Lbs/Acre
o. Lake/Reservoir Algae		_____ Mg./Liter
o. Lake/Reservoir Rooted Macrophytes		_____ Lbs/Acre
o. Aquatic Habitat Suitability	_____	_____
B.2. - Water Quality - Other		
p. Annual Nitrogen Applied		_____ Lbs/Acre/Year
p. Annual Phosphorus Applied		_____ Lbs/Acre/Year
p. Water Quality Concerns - Other	_____	_____
C.1. Air Quality		
a. Airborne Sediment/Smoke - Onsite Safety	_____	_____
b. Airborne Sediment/Smoke - Offsite Safety	_____	_____
c. Airborne Sediment/Smoke - Onsite Property	_____	_____
d. Airborne Sediment/Smoke - Offsite Property	_____	_____
e. Airborne Sediment/Smoke - Onsite Health	_____	_____
f. Airborne Sediment/Smoke - Offsite Health	_____	_____
9. Airborne Sediment/Smoke - Conveyance	_____	_____
h. Airborne Chemical Drift	_____	_____
i. Airborne Odors	_____	_____
j. Air Quality - Other	_____	_____
C.2. Air Condition		
a. Air Temperature	_____	_____
b. Air Movement	_____	_____
c. Humidity	_____	_____
d. Air Condition - Other	_____	_____

CHECKLIST OF RESOURCE PROBLEMS OR CONDITIONS

ANSWER ALL ITEMS AND DESCRIBE EACH YES ANSWER:

	Y/N	DESCRIPTION OF CONDITION
D.1. - Plants – Suitability		
a. Plants Not Well Adapted to Site	_____	_____
b. Plants Unsuitable for Intended Use	_____	_____
c. Plants Suitability – Other	_____	_____
D.2. - Plants - Condition		
a. Range Condition Index		_____ Index
a. Range Trend Condition Index		_____ Index
a. Plants Productivity	_____	_____
b. Plants Health & Vigor	_____	_____
b. Plant Damage from Wind Erosion	_____	_____
c. Plants Condition - Other	_____	_____
D.3. - Plants - Management		
a. Forest Cover Type		_____ Type Code
a. Potential Wood Production		_____ CuFt/Acre/Year
a. Site Index		_____ Site Index
a. Forest Stocking Level (Basal Area}		_____ SqFt/Acre
a. Number of Trees per acre		_____ Trees per Acre
a. Forage Production		_____ Lbs/Acre/Year
a. Forage Production		_____ AUM/Acre/Year
a Establishment, Growth and Harvest	_____	_____
b. Nutrient Management	_____	_____
c. Plant Pests	_____	_____
d. Threatened/Endangered Plants	_____	_____
d. Plant(s) Management - Other	_____	_____
E.1. - Animals - Habitat		
a. Domestic Animal Food Requirements	_____	_____
b. Domestic Animal Cover - Shelter	_____	_____
c. Domestic Animal Water Requirements	_____	_____
d. Domestic Animal - Other	_____	_____
E.1. - Animals - Habitat		
a. Wildlife Food Requirements	_____	_____
b. Wildlife Habitat Suitability		_____ Index
b. Wildlife Habitat Acres		_____ Acres
b. Wildlife Cover - Shelter	_____	_____
c. Wildlife Water Requirements	_____	_____
d. Threatened/Endangered Species	_____	_____
d. Wildlife - Other	_____	_____
d. Animal Habitat - Other	_____	_____
E.2. - Animals - Management		
a. Animals Population-Resource Balance Mgmt	_____	_____
b. Animal Health Management	_____	_____
c. Animal Management - Other	_____	_____

CHECKLIST OF RESOURCE PROBLEMS OR CONDITIONS

ANSWER ALL ITEMS AND DESCRIBE EACH YES ANSWER:

DESCRIPTION OF CONDITION

F.1. - Human – Economics

a. Conservation System Cost Effectiveness _____

b. Farm/Ranch Financial Condition ..... _____

c. Markets for Farm/Ranch Products ..... _____

d. Available Mgt, Land. Labor. Matls. Equip ... _____

e. USDA Base Acreage ..... _____

f. USDA Program Participation ..... _____

9. Long-term Financial Sustainability ..... _____

h. Economics Considerations-Other ..... _____

F.2. - Human – Social

a. Public Health & Safety ..... _____

b. Private/Public Values ..... _____

c. Client Characteristics ..... _____

d. Risk Tolerance-Aversion ..... _____

e. Tenure ..... _____

f. Social Considerations-Other ..... _____

F.3. - Human – Cultural

a. Absence/Presence of Cultural Resources ... _____

b. Significance of Cultural Resources ..... _____

c. Neutral/Positive Impact Cult Resource(s) .... _____

d. Mitigation of Negative Cultural Impacts ..... _____

e. Cultural Considerations-Other ..... _____

Other Concerns/Remarks: _____

_____

_____

Site-specific Practices Effects Worksheet

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-CPA-50
1-94

SITE-SPECIFIC PRACTICE EFFECTS

Natural Resource:

Land use:

Client:

FIELD OR CMU	3/ CONSERVATION PRACTICES	1/ 2/					
		4/					

1/ Enter the broad resource considerations illustrated in the CPPE matrix located in Section IV of the FOTG.
2/ Enter the resource problems that correspond to the resource considerations.
3/ Enter conservation practices from the FOTG that contribute toward solving the identified problems.
4/ Enter practice effects illustrated in the CPPE matrix or localized practice effects data sheets.

Resource Management System (RMS) Guidesheet

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE — NRCS-CPA-51 1-94	**Natural Resource:**	**Land use:**
RESOURCE MANAGEMENT SYSTEMS OPTIONS	**Client:**	**Field/CTU:**

OPTION NO.	**3/ RMS OPTIONS**	**1/**					
		2/					
		4/					

1/ Enter the broad resource considerations illustrated in the CPPE matrix located in Section V of the FOTG.
2/ Enter the resource problems that correspond to the resource considerations.
3/ Enter CMS options by listing combinations of practices based on the "Site Specific Practice Effects Worksheet".
4/ Enter the Effects of selected practices. Refer to CPPE matrix located in Section V FOTG (codes N/A, F, O, + or -).

Conservation Effects Treatment Options Worksheet

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE NRCS-CPA-54 1-94 **CONSERVATION EFFECTS TREATMENT OPTIONS**	**Name:**	**OPID:**
	Address:	**Field or Tract No.:**

Treatment Option No.	Description of Treatment Option (with treatment management system):

Actions - Proposed Management (Kinds, amounts, and timing):	**Effects (Effects of conservation treatment):**	**Comparison of Effects of Benchmark and Treatment Option**	
		Impacts	**Decisionmaker Evaluation**

CPA54.doc

Comments

The use of brand names does not constitute an endorsement by the Natural Resources Conservation Service.

CALIFORNIA
ENVIRONMENTAL ASSESSMENT WORKSHEET

Date_____

Client and/or Business Name:
Purpose and Need Statement (Client Objective):
Description of Proposed Project:
Treatment Unit: Farm #: Tract #: Field #:
Watershed:
Name of Person(s) Completing Worksheet:

- This worksheet is used to document the effects a proposed activity may have on natural, human, and cultural resources, in compliance with NEPA and NRCS NEPA Policy (General Manual 190, Section 410).
- Effects are documented in terms of: Short Term - those that occur during installation/construction; and Long Term - those that occur during and after the activity is finished. Onsite and offsite, positive and negative, and cumulative effects must be documented. If mitigation is proposed effects must be documented.

	Environmental Effects Element	Description of Effects
I.	SOIL:	
a.	Soil surface (e.g. disruptions, destruction of structure, displacements, compaction, deposition, removal of organic material, improvements)?	
b.	Soil fertility?	
c.	Unique geologic or natural physical features (e.g. covering, modification, partial destruction, protection, etc.)?	
d.	Wind or water erosion of soils, or soil erodibility, either on or off site?	
e.	Siltation, deposition or erosion which may impact or modify the channel of a river, stream, ocean shoreline, or other water?	
f.	Exposure of people or property to geologic hazards such as landslides, mudslides, subsidence or similar hazards?	
g.	Number of acres of prime &/or unique cropland?	
h.	Other?	
II.	WATER:	
a.	Stream channel dimension, pattern, and/or slope (including down stream impacts)?	
b.	Surface water infiltration rates, drainage patterns, velocities and/or volumes?	
c.	Quality or quantity of discharge into surface waters, including, but not limited to temperature, nutrients, bacteria, or turbidity?	
d.	Quantity of ground waters through either direct additions/withdrawals or interception of aquifers?	
e.	Ground water quality?	
f.	Amount of water available for public use?	
g.	Exposure of people or property to flooding?	
h.	Other?	

	Environmental Effects Element	Description of Effects
III.	AIR:	
a.	Air quality?	
b.	Odors?	
c.	Other?	
IV.	PLANTS:	
a.	Diversity of species, or numbers of any plant species (upland, riparian, wetland, etc.)?	
b.	Numbers or health & vigor of any unique, species of concern, rare, threatened or endangered plants?	
c.	Normal recruitment of existing, native species?	
d.	Other?	
V.	ANIMALS:	
a.	Diversity of species, or numbers of any species of animals (birds, mammals, fish, invertebrates)?	
b.	Unique, species of concern, rare, threatened, or endangered animals (review T&E lists)?	
c.	Native animals (migration barriers, competition from non-natives, etc.)?	
d.	Existing fish & wildlife habitat or critical habitat (nesting, spawning, etc.)?	
e.	Human activity during sensitive life stages (nesting, spawning, etc)?	
f.	Other?	
VII.	OTHER HUMAN CONSIDERATIONS:	
a.	Noise levels?	
b.	Present or planned land uses?	
c.	Aesthetic resource, scenic value, or natural area?	
d.	Recreational opportunities?	
e.	Public health and safety?	
f.	Public interest related to the site or watershed?	
g.	Economic impacts to the clients, landowners, or public?	
h.	Client well being?	
i.	Environmental justice?	
J.	Other?	

SPECIAL ENVIRONMENTAL CONCERNS: Check each category. If the effect is adverse or positive to any of the following, explain in the notes section or on an attachment. . Under **Present** indicate **Yes** or **No**. For **Cultural Resources** purposes, if the activity is an "Undertaking", separate primary documentation is required. For other **Concerns** supplemental documentation may be required.

Concerns	NRCS Policy Procedure	Present	Positive/Adverse Effect
Threatened or Endangered Species (To ensure actions do not jeopardize T&E species)	190 GM- 410.22 , California Endangered Species Handbook		
Natural Area (To recognize and consider impacts when planning and recommending actions adjacent to nearby Natural Areas)	190 GM 410.23		
Landscape Resource (To preserve and enhance scenic beauty or improve landscape)	190 GM 410.24		
Floodplain Management (To conserve, preserve and restore existing natural and beneficial values of floodplains)	190 GM 410.25		
Wetland (To protect, maintain and restore wetland functions and values)	190 GM 410.26, NFSA Manual		
Stream Channel Modification (To maintain and restore streams, wetlands and riparian vegetation as functioning parts of a viable ecosystem)	190 GM 410.27-28		
Riparian Area (To protect, maintain, and restore riparian areas)	190 GM 411		
Prime and Unique Farmland (To minimize unnecessary and irreversible conversion of farmland to non agricultural use)	310 GM 403		
Cultural Resources (To preserve and prevent the destruction or degradation of cultural resources, including historical archaeological sites and traditional cultural places)	420 GM 401		
Coastal Zone Management Area (To ensure conservation of coastal resources)	Federal Register 6/25/99, PL 92-583		
Wild and Scenic River (Consideration of impacts when actions affect areas adjacent to Wild and Scenic Rivers)	Federal Register 9/7/82, p. 39454		
Special Aquatic Site (To protect, restore and maintain special aquatic sites)	Federal Register 12/24/80 EPA 404(b)(1) 230.3 & 230.10		
Essential Fish Habitat (To conserve and enhance fish habitat for salmon, shellfish, marine fish)	50 CFR 600.905-930 Federal Register 12/19/97		

OTHER CONSIDERATIONS

Documentation of the following questions can be completed here.

a. If wetland impacts are proposed, conduct a wetland determination and complete the NRCS minimal effects procedure per the Food Security Act Manual. Make certain that the client contacts the US Army Corps of Engineers to determine the need for a Permit under Section 404 of the Clean Water Act and Section 10 Rivers and Harbors Act and the Regional Water Quality Control Board for Section 401 Clean Water Act certification.

_____

_____

b. If a stream, lake or other water body is involved the client should contact the California Department of Fish and Game for a Section 1600 Stream Alteration Agreement.

_____

c. Document mitigation planned or required to avoid, minimize, or compensate for negative impacts:

d. Document communications with USFWS, NMFS, Corps of Engineers, EPA, CDFG, RWQCB, NRCS Biologist, etc.

e. Discuss any **Cumulative Effects** (beneficial or adverse):

f. Alternatives to Proposed Action that were considered (include reasons why alternative was not selected):

1. No Action
2.
3.
4.

g. Remarks or Other Considerations:

RECOMMENDATION (check one)

☐ Based upon the conclusions below, I find that this action will not have significant adverse impacts on the quality of the human environment. No further environmental analysis is required. The assessment indicates work should proceed.

☐ Further analysis is necessary, including the possible need to prepare an Environmental Impact Statement or a Finding Of No Significant Impact. The landowner will be informed not to proceed until further assessment is completed.

h. Conclusions, based upon the assessment (rationale for the findings above):

Signature (Planner)	Title	Date

Reviewed/Concurred By	Title (District Conservationist)	Date

APPENDIX 2: DEPARTMENT OF FISH AND GAME MEMORANDUM OF AGREEMENT AND TEMPLATE 1601/1603 INDIVIDUAL AGREEMENT

State of California - The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
(707) 944-5500

GRAY DAVIS, *Governor*

May 13, 2003

Mr. Bob Neale
Sustainable Conservation
121 2nd Street, Floor 6
San Francisco, CA 94105

Dear Mr. Neale:

Memorandum of Agreement
Permit Coordination Program
Streambed Alteration Notification and Agreements
California Central Coast Area

Enclosed are one original and one copy of the executed Memorandum of Agreement for the Partners in Restoration Permit Coordination Program. Please forward the documents as appropriate to the participants. I appreciate the hard work that has gone into this project and look forward to a productive continuing effort with all the participating resource conservation districts. This program should assist in our continued coordination and the development of projects and streambed alteration agreements that conserve habitat values for fish and wildlife in central coastal California.

If you have any questions, please do not hesitate to contact me at (707) 944-5584.

Sincerely,

Scott Wilson

Scott Wilson
Habitat Conservation Supervisor
Central Coast Region

MEMORANDUM OF AGREEMENT
BETWEEN
THE CALIFORNIA DEPARTMENT OF FISH AND GAME,
THE NATURAL RESOURCES CONSERVATION SERVICE,
AND RESOURCE CONSERVATION DISTRICTS
REGARDING THE PARTNERS IN RESTORATION
PERMIT COORDINATION PROGRAM AND
STREAMBED ALTERATION NOTIFICATION AND AGREEMENTS

Whereas, the Department of Fish and Game (DFG) is charged with the protection and enhancement of the fish and wildlife resources of the State of California; and

Whereas, the protection of fish and wildlife resources depends largely upon the preservation of the quality and quantity of their respective habitats; and

Whereas, Fish and Game Code Sections 1601 and 1603 requires notification of DFG whenever a project will obstruct or divert the natural flow or change the bed, channel, or bank of any river, stream or lake; and

Whereas, Fish and Game Code Sections 1601 and1603 allows DFG to propose reasonable modifications to public agency and private landowner construction projects as would allow for the protection and continuance of existing fish and wildlife resources that may be substantially adversely affected by that construction project; and

Whereas, consistent with the policies of Fish and Game Code Section 1600 et seq. the protection and conservation of the fish and wildlife resources of California are of utmost public interest and fish and wildlife conservation is a proper responsibility of the State; and

Whereas, the missions of the Natural Resources Conservation Service (NRCS) and the signatory Resource Conservation Districts (RCDs) are to work in partnership to provide technical assistance and cost-sharing to private landowners to assist them with conservation projects on their property to reduce erosion and sedimentation and thereby protect surrounding natural resources; and

Whereas, the NRCS and RCDs have, and continue to, worked closely with local community groups to create watershed plans and to protect and improve the biological functioning of their watersheds and natural resources, and have been identified as appropriate organizations to assist local landowners in implementing the plan; and

Whereas the NRCS and RCDs, in cooperation with DFG and other local, state and federal regulatory agencies are cooperating in establishing Partners in Restoration permit coordination programs (Programs) to coordinate and simplify the regulatory review process to encourage private landowners to implement habitat enhancement and protection projects on their property; and

Whereas the NRCS conservation practices included in the Programs are recommended by the U.S. Environmental Protection Agency, the California State Water Resources Control Board, the California Coastal Commission and DFG as appropriate resource management practices to protect and restore fish and wildlife habitat and are small in scope and are designed to have minimal adverse impacts on the environment; and

Whereas, this Memorandum of Agreement (MOA) is not intended to affect NRCS and RCD rights under the Fish and Game Code Section 1601 (f) or private landowners under Section 1603 (f) to undertake work necessary to protect life or property or constitute a waiver of NRCS and RCDs claimed rights to implement or maintain conservation practices in areas outside DFG's jurisdiction; and

NOW, THEREFORE, IT IS AGREED THAT:

1. DFG, NRCS, and RCDs in each area where the Program is established will develop and agree upon a template 1601/1603 agreement (Template Agreement) for this process. Each Template Agreement is attached as Exhibit A1, A2, and continuing in this sequence for each Program and becomes part of the MOA. Individual 1601/1603 Agreements (Individual Agreement), based on each Program's Template Agreement, will be completed for each project developed under each Program.

2. Under each Program, the NRCS shall enter into a "Cooperator Agreement" with the landowner and/or party legally responsible for carrying out the work (Operator) and contractors performing work associated with the project and shall have the Operator sign a draft 1601/1603 Individual Agreement (Draft Agreement), based on the Template Agreement. The RCD and NRCS shall ensure that: 1) the name and address portion at the top of the Draft Agreement is completed, 2) the Draft Agreement is dated, 3) the DFG assigned notification number is on the Draft Agreement, 4) the Draft Agreement contains the original signature of the Operator, and 5) the Draft Agreement includes a brief project description which includes the following information:

1. Nature of work to be accomplished and reason why the applicant is carrying out the project.
2. Location of project (address and landmarks to guide someone to the project site), name of creek/tributary, and the stream it drains to.
3. Dimensions of area of impact, description of materials, areas of revegetation/restoration, facilities or vegetation removed and installed.
4. Environmental setting – surrounding habitats and vegetation, current land use and surrounding land uses (farmland, urban, rural, etc.)
5. Potential presence of sensitive species and quality of habitat.
6. Estimated location and number of creek crossings, number of times crossing will be necessary, and type of vehicle used (track or rubber tire).
7. Presence of barriers to aquatic species migrations, if any.
8. Pre-project visual assessment of vegetation conditions when native vegetation will be removed and revegetation will occur.

3. The NRCS and RCD shall retain the Draft Agreement until the final design for the Cooperator Agreement is completed.

4. When the final design for the Cooperator Agreement is completed, the NRCS and RCDs shall send the signed Draft Agreement to DFG. These Draft Agreements shall be sent to: Department of Fish and Game, Streambed Alteration Program, Post Office Box 47, Yountville, CA 94599.

5. DFG shall review the Draft Agreements for consistency with the Template Agreements, conduct its environmental review pursuant to California Environmental Quality Act (CEQA), and sign the Draft Agreements. Once signed, the Draft Agreements are considered final, Individual Agreements. DFG shall then return the Individual Agreements to the RCDs and local NRCS at the appropriate address listed under Paragraph 12 below. DFG shall make every attempt to return the Individual Agreements within 15 days of receipt.

6. If DFG receives a request from the Operator to amend an Individual Agreement, DFG shall notify and consult with the NRCS and RCDs before approving the request. DFG shall also notify the NRCS and RCDs if they subsequently approve the requested amendment.

7. The NRCS shall attach the Individual Agreement to the signed Cooperator Agreement. The NRCS shall notify the Operator in the Cooperator Agreement that the Individual Agreement is an additional binding requirement, supplemental to the Cooperator Agreement.

8. Each RCD shall provide to DFG, within 30 days of execution of this MOA, and/or within 30 days of becoming a signatory to this MOA, a check in the amount of $2,400.00 to cover DFG's cost for the first 25 Individual Agreements completed under their respective Program. In the event that additional projects and Individual Agreements will be required before the expiration of this MOA, the RCDs shall forward a check for $500 for each additional five agreements. The checks shall be mailed to: Department of Fish and Game, Streambed Alteration Program, Post Office Box 47, Yountville, CA 94599 and shall reference 'Name of Watershed' MOA Individual Agreement Fee" and the RCD's name on the check and cover letter.

9. The NRCS and/or RCD shall provide to DFG, written notification of the proposed Program projects to be performed that year by June 1 of each year. Additional projects may be submitted after this date, at DFG's discretion. This notification shall consist of a list of projects, their location, stream name, operator names, practices to be used, and a map showing their locations. Upon receipt of the written notification, DFG shall assign a notification number to each project. These numbers will be sent via email to NRCS and RCD staff. The assigned notification number shall be included on the Draft Agreements that the NRCD and RCDs send to DFG per Condition 4 above. DFG may request, within 21 days of the receipt of the written

notification, a meeting with the NRCS and RCD to review future projects at a mutually agreed upon time and place within 30 days of the request. DFG will verify the consistency of individual projects with the goals and conditions of the Program and may provide additional conditions to the Draft Agreement for those projects. The NRCS and RCD shall include such conditions as part of the project plan. DFG may provide additional information on species of concern that may be in the project area and DFG may require additional conditions such as surveys, avoidance, or development of mitigation measures.

10. NRCS and RCDs shall provide an annual report to DFG. The report shall list participating Operators and describe each specific project's purpose, location, DFG notification number, area affected, natural resource enhancements, and modification to the bank or channel. It shall list conservation benefits including gains in wetland and riparian areas, revegetation success, and provide photo documentation of site conditions before and after implementation. For projects where revegetation is a component, projects from previous years will also be included in each annual report until success, as described in the Individual Agreement, is achieved. The annual report shall be based on NRCS status reviews and shall be due January 31.

11. This MOA and its Exhibits cannot be amended or modified in any way except by written notification duly executed by DFG, RCDs, and NRCS. Any proposal for amendment or modification must be delivered for review and approval by DFG, the NRCS and the affected RCDs.

Notwithstanding the foregoing, the addition of Resource Conservation Districts as signatories to this MOA shall not require the written consent of all the signatories hereto, but may be accomplished by such Resource Conservation Districts with the written consent of the NRCS and DFG.

Participation of a signatory in this MOA may be terminated by any party following a 30-day written notice by that signatory. Upon termination, the activities of the Operators shall be governed by applicable provisions of Fish and Game Code section 1600 et seq. This MOA shall remain in effect until December 31, 2008 unless extended by mutual written agreement of all parties.

12. All written notifications herein provided to be given or which may be given by any one party to the others, shall be addressed to the following. Contact information for additional signatories will be included on their signature pages.

Department of Fish and Game
Scott Wilson, 1600 Program Supervisor
Department of Fish and Game
Central Coast Region
P. O. Box 47
Yountville, CA 94599
(707) 944-5584
swilson@dfg.ca.gov

NRCS State Office
Dianne Holcomb
NRCS
430 G Street, #4164
Davis, CA 95616
(530) 792-5667
diane.holcomb@ca.usda.gov

Elkhorn Slough Program
Emily Hanson
Resource Conservation District of Monterey County
744 La Guardia Street, Bldg. A
Salinas, CA 93905
(831) 424-1036 x 124
rcdmonterey@yahoo.com

Cheryl Lambert
NRCS
744 La Guardia Street, Bldg. A
Salinas, CA 93905
(831) 424-1036
cheryl.lambert@ca.usda.gov

Coastal Marin Watersheds Program
Nancy Scolari
Marin Resource Conservation District
PO Box 1146
Point Reyes Station, CA 94956
(415) 663-1170
marinrcd@svn.net

Charlette Sanders, District Conservationist
NRCS
1301 Redwood Highway
Petaluma, CA 94954
(707) 794-1242
charlette.sanders@ca.usda.gov

Morro Bay Program
Malcolm McEwen
Coastal San Luis RCD
545 Main Street, Ste. B-1
Morro Bay, CA 93442
(805) 772-4391
mamcewen@fix.net

Margy Lindquist, District Conservationist
NRCS
65 Main Street, Suite 108
Templeton, CA 93465
(805) 434-0396
margy.lindquist@ca.usda.gov

Navarro River Program
Patty Madigan
Mendocino County Resource Conservation District
PO Box 1697
Mendocino, CA 95460
(707) 964-0395
pmad@mcn.org

Tom Schott, District Conservationist
NRCS
405 S. Orchard Ave.
Ukiah, CA 94582
(707) 468-9223 x 112
thomas.schott@ca.usda.gov

Salinas River Program
Emily Hanson
Resource Conservation District of Monterey County
744 La Guardia Street, Bldg. A
Salinas, CA 93905
(831) 424-1036 x 124
rcdmonterey@yahoo.com

Danny Marquis
NRCS
522 N. Second Street
King City, CA 93930
(831) 385-5545
danny.marquis@ca.usda.gov

13. This Agreement shall be governed by the laws of the State of California, or Federal law as applicable. Actual or threatened breach of this Agreement may be prohibited or restrained by a court of competent jurisdiction.

14. The program and activities conducted under this agreement will be in compliance with all applicable Federal civil rights laws, rules, regulations, and policies.

15. This MOA is solely for the benefit of the People of the State of California, by and through DFG or its designated representative, RCDs, and NRCS.

16. From time to time, the Parties shall by mutual agreement execute such instruments and other documents, and take such other actions, as may be reasonably necessary to carry out the terms of this MOA. This MOA cannot be amended or modified in any way except by a written instrument duly executed by the Parties. In any action requiring the agreement or approval of either of the Parties, such agreement or approval shall not be unreasonably denied or withheld, so long as it does not substantially alter the MOA, duties and remedies of the Parties.

17. It is acknowledged that the purpose of this MOA is to set forth the roles and responsibilities of the Parties with respect to the coordination of the Program and the 1601 and 1603 Agreement approval processes.

18. This MOA shall be immediately effective upon execution by the Parties.

19. This MOA includes and incorporates the following:

EXHIBIT A1 - Elkhorn Slough Template 1601/1603 Agreement
A2 - Coastal Marin Template 1601/1603 Agreement
A3 - Morro Bay Template 1601/1603 Agreement
A4 - Navarro River Template 1601/1603 Agreement
A5 - Salinas River Template 1601/1603 Agreement

EXHIBIT B - Template Cooperator Agreement: Terms of Assistance and Notification Regarding the Procedures for Conformance with Multiple Permits

EXHIBIT C1 - Elkhorn Slough Map of Geographic Scope
C2 - Coastal Marin Map of Geographic Scope
C3 - Morro Bay Map of Geographic Scope
C4 - Navarro River Map of Geographic Scope
C5 - Salinas River Map of Geographic Scope

Additional Exhibits associated with new signatories will be identified and referenced on the signature pages.

The Parties acknowledge and accept the terms and conditions of this MOA as evidenced by the following signatures of their duly authorized representatives. It is the intent of the Parties that this MOA shall become operative on the last date written below.

NATURAL RESOURCES CONSERVATION SERVICE

Date: 5/7/03

Chuck Bell
State Conservationist
Authority: 16 U.S.C. 590(d) and 2005

CALIFORNIA DEPARTMENT OF FISH AND GAME

Date: 5/12/03

Robert W. Floerke
Regional Manager, Central Coast Region

COASTAL SAN LUIS RESOURCE CONSERVATION DISTRICT

Date: 1 MAY 2003

~~Neil Havlik~~ Linda Chipping
President

RESOURCE CONSERVATION DISTRICT OF MONTEREY COUNTY
(for Elkhorn Slough and Salinas River Programs)

Date: 4/25/03

Paul Binsacca
President

MENDOCINO RESOURCE CONSERVATION DISTRICT

Date: 4-17-2003

Charles Crayne
Chairman

MARIN RESOURCE CONSERVATION DISTRICT

Date: 4-23-03

Hank Corda
President

EXHIBIT A2
Marin Coastal Watersheds Partners in Restoration Permit Coordination Program
Template Agreement

Notification Number: 1600-200X-XXXX-3
xxx Creek, xxx County

Operator:
[OPERATOR'S NAME/AGENCY]
[OPERATOR'S ADDRESS]
[OPERATOR'S ADDRESS]

PROJECT DESCRIPTION and PROJECT CONDITONS

I. Project Description

The project below is enrolled in the Marin Coastal Watersheds Partners in Restoration Permit Coordination Program, subject to and described in the Memorandum of Agreement between the California Department of Fish and Game (DFG), the Marin Resource Conservation District (MRCD), and the Natural Resources Conservation Service (NRCS).

Insert a simple description of the project including:

1. Nature of work to be accomplished and reason why the applicant is carrying out the project.
2. Location of project (address and landmarks to guide someone to the project site) name of creek/tributary, and the stream it drains to.
3. Dimensions of area of impact, description of materials, areas of revegetation/restoration, facilities or vegetation removal and installed.
4. Environmental setting – surrounding habitats and vegetation, current land use and surrounding land uses (farmland, urban, rural, etc.)
5. Potential presence of sensitive species and quality of habitat.
6. Estimated location and number of creek crossings, number of times crossing will be necessary, and type of vehicle used (track or rubber tire).
7. Presence of barriers to aquatic species migrations, if any.
8. Pre-project visual assessment of vegetation conditions when native vegetation will be removed and revegetation will occur.

II. Definitions

The following definitions shall govern this Agreement:

A. Management practices – only those practices described below in III. Authorized Activities.

B. The Marin Coastal Watersheds are defined as including: Stemple Creek, the Tomales Bay watershed including Lagunitas Creek, Walker Creek and eastern shore tributaries, and the Drakes Bay Estero watershed. Within each watershed are numerous smaller tributaries.

C. A water body is understood to be a creek, river, or stream having a defined bed and bank, and/or a pond, lake or seasonal impoundment.

D. NRCS defines customers as ranchers, growers, and land managers who have signed a *Cooperator Agreement: Terms of Assistance and Notification Regarding the Procedures for Conformance with Multiple Permits* form with NRCS and the MRCD.

III. Authorized Activities

The landowner and/or party legally responsible for carrying out the work (Operator) is responsible for compliance with the terms of this Agreement, including violations committed by contractors and/or sub-contractors. DFG reserves the right to suspend construction activities described in this agreement if DFG determines any of the following have occurred:

A. Failure to comply with any of the conditions of this agreement.
B. Information provided in support of the Agreement is determined by DFG to be incomplete or inaccurate.
C. Information becomes available to DFG that was not known when preparing the original conditions of the Agreement including, but not limited to, the occurrence of State or federally listed species in the area or risk to resources not previously observed.
D. The project as described has changed or conditions affecting fish and wildlife resources have changed.

The Marin Coastal Watershed Partners in Restoration Permit Coordination Program includes fourteen management practices selected from the NRCS' California Field Office Technical Guide (FOTG) potentially under DFG jurisdiction and subject to a 1603 Streambed Alteration Agreement. Only the following management practices with check marks in the boxes are covered under this Agreement.

□ **1. Access Roads**: Improvements to an existing road to control runoff, prevent erosion, or maintain or improve water quality while providing access for property management. Examples of this practice are placement of rolling dips or outsloping a road.

□ **2. Animal Trail and Walkway:** Provides a travel lane for animals to walk through difficult or ecologically sensitive terrain. Generally installed to improve access to forage or water and to divert travel away from or minimize travel through riparian areas.

□ **3. Critical Area Planting:** Planting vegetation such as trees, shrubs, vines, grasses, or legumes to stabilize soil on highly erodable or critically eroding areas in order to reduce damage from sediment and runoff to downstream areas.

□ **4. Filter Strip:** A strip or area of vegetation for removing sediment, organic matter, or other pollutants from wastewater.

□ **5. Fish Stream Improvement**: Improving a stream channel to create new fish habitat or to enhance an existing habitat through methods described in the California Salmonid Stream Habitat Restoration Manual.

□ **6. Grade Stabilization Structure:** A structure, usually constructed of wood, concrete or boulders, built into the creek bed or channel bottom of a non-fish bearing stream to control the grade and prevent head cutting in natural or artificial channels.

□ **7. Pipeline:** Pipeline installed for conveying water for livestock or for recreation. Installation may require crossing streams or channels.

□ **8. Sediment Basin:** When an off-channel basin constructed to collect and store debris or sediment includes a structure that outlets into a stream or lake, the outlet is subject to a 1603 agreement.

□ **9. Spring Development:** Improvement of springs or seeps by fencing out livestock, excavating, cleaning, capping or providing collection or storage facilities.

□ **10. Streambank Protection:** Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion. Typical structures included under this practice include willow cribwalls or rock rip-rap keyed into the toe of the bank

□ **11. Stream Channel Stabilization:** Stabilizing the channel of a stream with suitable structures, typically earth or rock, when aggradation or degredation cannot be controlled with upstream practices. This practice may also include the removal of accumulated sand or sediment.

□ **12. Structure for Water Control:** The replacement of degraded culverts that are impairing waterways or fisheries habitat and/or the placement of new culverts determined to have benefits to waterways and fisheries.

□ **13. Underground Outlet:** A conduit installed beneath the surface of the ground to collect surface water and convey it to a suitable outlet.

□ **14. Water and Sediment Control Basin:** An earthen embankment or a combination of ridge and channel generally constructed across the slop and minor water courses to form a sediment trap and water detention basin. If the project includes a structure that outlets to a stream or creek, the outlet is subject to a 1603 agreement

IV. Conditions

If one of the following boxes is checked, all the conditions listed under that letter shall be included in the project design and implementation plan.

□ **A. General Conditions:** These apply to all projects.

1. Practices shall be implemented and annual maintenance restricted to the period between June 1 and October 31. Work in and around streams that support steelhead trout populations may not begin until June 15. Work beyond this time frame may be authorized following consultation with and approval of the local

DFG biologist, provided it could be completed prior to first flows.

2. Construction within 75 feet of established riparian vegetation shall be avoided during the migratory bird-nesting season, (February 15 - August 1) to avoid damage or disturbance to nests. If construction must occur during this period, a qualified biologist or individual approved by DFG shall conduct a pre-construction survey for bird nests or nesting activity in the project area. If any active nests or nesting behaviors are found (for species other than starlings and house sparrows), an exclusion zone of 75 feet shall be established to protect nesting riparian birds. If any listed or sensitive bird species are identified, DFG must be notified prior to further action. Take of active bird nests is prohibited.

3. No work shall be conducted in a flowing stream/creek, or in permanent or seasonally ponded areas except as described under paragraph E of this Agreement. In those specific cases where it is deemed necessary to work in a flowing stream/creek, the work area shall be isolated and all the flowing water shall be temporarily diverted around the work site to maintain downstream flows during construction. When construction is completed, the flow diversion structure shall be removed in a manner that will allow flow to resume with the least disturbance to the substrate. Fish shall not be trapped or isolated by the diversion structure.

4. The implementation and maintenance of projects shall not result in sediment deposition in downstream areas.

5. Use of heavy equipment shall be avoided in a channel bottom with rocky or cobbled substrate. If access to the work site requires crossing a rocky or cobbled substrate, a rubber tire loader/backhoe is the preferred vehicle and the amount of time this equipment is stationed, working, or traveling within the creek bed shall be minimized. When heavy equipment is used, woody debris and vegetation on banks and in the channel shall not be disturbed if outside of the project's scope. Heavy equipment shall not be used in a flowing stream, creek or ponded area, except to cross a stream or pond to access the work site.

6. No more than 0.10 acres of native riparian shrubs or woody perennials shall be removed from a stream area. Where the area contains a mix of native and invasive species, up to 0.25 acres may be removed from a streambank or stream channel. If the area is exclusively, non-native plants, up to five acres of riparian vegetation may be removed. Any area cleared of vegetation must be revegetated with native plant species. Non-invasive, non-persistent grass species (i.e. barley grass) may be used in conjunction with native species to provide fast establishing, temporary cover for erosion control.

7. Any stream bank area left barren of vegetation as a result of the implementation or maintenance of the practices shall be restored to a natural state by seeding, replanting, or other agreed upon means with native trees, shrubs, and/or grasses prior to October 15 of the project year. Work beyond this time frame may be

authorized following consultation with and approval of the local DFG biologist, provided it could be completed prior to first flows. Barren areas shall typically be planted with a combination of willow stakes, native shrubs and trees and/or erosion control grass mixes.

8. For projects that have removed native vegetation, post-construction revegetation success shall be equivalent or better to the pre-project condition provided in the project description. If after five years this level of success has not been achieved, the Operator shall consult with DFG to develop and implement measures to achieve success.

9. Hand labor shall be used to trim vegetation within the channel or on the bank. Handheld equipment such as weedwhackers and chainsaws is authorized.

10. Except with approval from DFG staff, there shall be no cutting or removal of native trees 4 inches or greater dbh (diameter at breast height), except willows, for which there shall not be cutting or removal of trees 6 inches or greater dbh. For any permitted removal of any native tree, the root structure of the tree shall be left intact unless authorized by DFG staff.

11. The use or storage of petroleum-powered equipment shall be accomplished in a manner to prevent the potential release of petroleum materials into waters of the state (Fish and Game Code 5650).

12. Debris, soil, silt, bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, resulting from projected related activities, shall be prevented from contaminating the soil and/or entering the waters of the State. Any of these materials, placed within or where they may enter a stream or lake, by Operator or any party working under contract, or with permission of the Operator, shall be removed immediately.

13. All debris, sediment, rubbish, vegetation or other material removed from the channel banks, channel bottom, or sediment basins shall be removed to a location where they shall not re-enter the waters of the state.

14. A copy of this agreement must be provided to the Contractor and all subcontractors who work within the stream zone and must be in their possession at the work site.

15. Any violation of the terms of this Agreement may result in the project being stopped, a citation being issued, or charges being filed with the District Attorney. DFG shall make an effort to obtain voluntary compliance from the Operator, in coordination with the NRCS/MRCD, when a violation exists before taking other action.

16. DFG personnel or its agents may inspect the work site at any time. When inspections are pre-arranged, DFG will notify NRCS and MRCD and invite them to such inspections when possible and when approved by the landowner.

17. To the extent that any provisions of this Agreement provide for activities that require the Operator to traverse another owner's property, such provisions are agreed to with the understanding that the Operator possesses the legal right to so traverse. In the absence of such right, any such provision is void.

18. This agreement does not allow for the take, or incidental take of any State or Federal listed threatened or endangered listed species. The Operator is required, as prescribed in the state or federal endangered species acts, to consult with the appropriate agency prior to commencement of the project. Any unauthorized take of such listed species may result in prosecution.

19. The issuance of these conditions by DFG does not constitute a valid water right. We recommend that you contact the State Water Resources Control Board (SWRCB) to ensure that you have a valid basis of right for projects that involve the diversion and storage of water and that those projects are in compliance with California Water Code.

□ B. Special provisions for implementation and maintenance of an Access Road Improvement, Animal Trail and Walkway, Filter Strip, or Underground Outlet

1. Construction or maintenance activities for the above listed practices shall not result in increases in turbidity in the stream (as measured by Nephelometric Turbidity Unit (NTU)) of more than 10% of the upstream background.

2. Where construction of an underground outlet involves out letting a pipe into a stream, an energy dissipater shall be installed to reduce bed and bank scour.

3. All concrete shall be allowed to cure for a minimum of 30 days before being exposed to stream water or waters that may enter a stream, or all concrete shall be coated with a DFG approved concrete sealant. If sealant is used, water shall be excluded from the site until the sealant is dry.

□ C. Special provisions for implementation and maintenance of a Critical Area Planting

1. When implementing or maintaining a critical area planting above the high water line a filter fabric fence, fiber rolls and/or hay bales shall be utilized, if needed, to keep soil from flowing into the adjacent water body. At the time vegetation is sufficiently mature to provide erosion control it may be appropriate to remove the fence, fiber rolls and/or hay bales. Annual review by NRCS shall occur until the critical area planting is established to control erosion.

2. Except as noted below, no pesticides or fertilizers shall be used in the stream area to hasten or improve the growth of critical area plantings. Herbicides may be applied to control established stands of non-native species including, but not limited to, Giant Reed (*Arundo donax*), Vinca Spp., Himalaya Berry, Gorse, and non-native Broom species. Herbicides must be applied to those species according to the registered label conditions. Herbicides must be applied directly to plants and may not be spread upon any water. Fertilizers may be used above the normal high water mark the year of planting if necessary.

3. If needed, an irrigation system shall be installed to ensure the establishment of vegetation. If the irrigation system relies on water from a stream or creek will meet NMFS Water Drafting Specifications (August 2001). In addition to water drafting specifications projects that are implemented within fish bearing streams shall meet NMFS Fish Screening Criteria (1997) and the addendum for Juvenile Fish Screen Criteria for Pump Intakes (May 9, 1996). When the vegetation is sufficiently established, the irrigation materials shall be removed.

□ **D. Procedures for implementation and maintenance of Fish Stream Improvement**

1. The Fish Stream Improvement conservation practice will be designed and implemented in accordance with the California Department of Fish and Game's *California Salmonid Stream Habitat Restoration Manual.*

2. The NRCS and MRCD will consult with DFG personnel when designing these practices. Visits to project sites incorporating these practices may occur.

3. No chemically-treated timbers shall be used on instream structures.

□ **E. Special provisions for implementation and maintenance of Grade Stabilization Structure, Stream Bank Protection and Stream Channel Stabilization.**

1. Construction and maintenance of Grade Stabilization Structures in streams or creeks which support a salmonid fishery shall be the subject of a specific Agreement under Fish and Game Code section 1600 et. seq., and are not covered by this Agreement.

2. No chemically treated timbers shall be used for grade or channel stabilization structures, bulkheads or other instream structures.

3. All concrete shall be allowed to cure for a minimum of 30 days before being exposed to stream water or water that may enter the stream, or all concrete shall be coated with a DFG approved concrete sealant. If sealant is used, water shall be excluded from the site until the sealant is dry.

4. Sediment removal from the stream channel or ponds may occur if it will improve biological functioning of the stream and restore channel capacity. Sediment

removal may not occur in a flowing stream or standing water.

□ **F. Procedures for implementation and maintenance of Pipeline**

1. Pipeline shall be installed or maintained only when a streambed is dry.

2. Trenching associated with this practice must be a minimum of three feet deep.

□ **G. Procedures for implementation and maintenance of Sediment Basin and Water and Sediment Control Basin**

1. Sediment basins shall not be constructed in a stream channel or other permanent water bodies.

2. Construction of sediment basins shall occur on or after August 1 to avoid impacts to bird nesting sites. Maintenance may occur from August 1 to October 15 in areas where water and sediment control basins create conditions that attract nesting birds and other wildlife.

3. An energy dissipater shall be installed on outlets to reduce bed and bank scour.

4. Construction or maintenance activities of sediment basins shall not result in increases in turbidity in the stream (as measured in Nephelometric Turbidity Unit (NTU)) of more than 10 percent of upstream background.

□ **H. Procedures for implementation and maintenance of Structure for Water Control:**

1. Culverts in fish bearing streams shall be consistent with California Department of Fish and Game's "Culvert Criteria for Fish Passage" (September, 2001) and National Marine Fisheries Service Southwest Region's "Guidelines for Salmonid Passage as Stream Crossings" (September, 2001).

V. Amendments and Renewals

The Operator shall notify and receive written concurrence from DFG before any modifications are made to project plans developed under the permit coordination program. Project modifications may require an amendment to this agreement or a new agreement. Modifications that reduce the scope and/or scale of the project as described in the above Project Description and remain within the maximum project size defined in the Marin Coastal Watersheds Partners in Restoration permit coordination program is allowable without further notification or approval. Individual conservation practices checked above may be eliminated from the project if it decreases the footprint and does not result in increased negative impacts to fish, wildlife, habitat or waters of the State. Conditions checked above are required conditions of the project and

MAY NOT be eliminated without written notification from DFG.

If the Operator would like to renew the agreement beyond the expiration date a written request for a renewal must be submitted to the NRCS/MRCD for consideration at least 60 days before the agreement expiration date. The renewal may require a new fee. Renewals of the original agreement are issued at the discretion of the NRCS, MRCD and DFG.

I, the undersigned, state that the above is the final description of the project I am submitting to DFG for review, and I agree to implement the conditions above required by DFG as part of that project. I will not proceed with this project until DFG signs the Agreement. I understand and agree that I am liable for compliance with the terms of this Agreement, including violations committed by contractors and/or subcontractors.

Operator's name (print): _____

Operator's signature: _____

Signed the _____ day of _____, 200_

It is acknowledged that the following original of the California Department of Fish and Game Memorandum of Agreement and Template 1601/1603 Individual Agreement contains language that may differ from the Project Description and Environmental Protection and Mitigation Measures contained in the Marin Resource Conservation District's Initial Study and Mitigated Negative Declaration for the Marin Coastal Watersheds Permit Coordination Program. When regulatory agencies have different standards for issuing permits, this program adopts the most restrictive. When this program references other documents that may contain less restrictive standards, only the more restrictive standards will be used.

Appendix 3: NRCS Conservation Practice Standards Codes as Annotated for the Permit Coordination Program

It is acknowledged that the following NRCS Conservation Practice Standards Codes may contain language that differs from the Project Description and Environmental Protection and Mitigation Measures contained in the Marin Resource Conservation District's Initial Study and Mitigated Negative Declaration for the Marin Coastal Watersheds Permit Coordination Program. When regulatory agencies have different standards for issuing permits, this program adopts the most restrictive. When this program references other documents that may contain less restrictive standards, only the more restrictive standards will be used.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

ACCESS ROAD
(Feet)
CODE 560

DEFINITION

A travel-way for equipment and vehicles constructed as part of a conservation plan.

PURPOSES

To provide a fixed route for vehicular travel for resource activities involving the management of timber, livestock, agriculture, wildlife habitat, and other conservation enterprises while protecting the soil, water, fish, wildlife, and other adjacent natural resources.

CONDITIONS WHERE PRACTICE APPLIES

Where access is needed from a private or public road or highway to a land use enterprise or conservation measure, or where travel ways are needed in a planned land use area.

Access roads range from seasonal use roads, designed for low speed and rough driving conditions, to all-weather roads heavily used by the public and designed with safety as a high priority. Some roads are only constructed for a single purpose; i.e. control of forest fires, logging and forest management activities, access to remote recreation areas, or access for maintenance of facilities.

CRITERIA

Access roads shall be designed to serve the enterprise or planned use with the expected vehicular or equipment traffic. The type of vehicle or equipment, speed, loads, soil, climatic, and other conditions under which vehicles and equipment are expected to operate need to be considered. Planned work shall comply with all federal, state and local laws and regulations.

Visual resources and environmental values shall be considered in planning and designing the road system.

Where general public use is anticipated, roads shall be designed to meet applicable federal, state and local criteria.

Sound engineering practices shall be followed to insure that the road meets the requirements of its intended use and that maintenance requirements are in line with operating budgets.

Clearing of land and disposal shall be carried out in accordance with state laws and county ordinances.

The cross-section shall be adequate to carry collected water to protected drop inlets or on protected waterways to appropriate release points. Roads may be out-sloped only where adequate provisions are made to collect the runoff water and to discharge the flow into stable watercourses.

Location - Roads shall be located to serve the purpose intended, to facilitate the control and disposal of surface and subsurface water, to control or reduce erosion, to make the best use of topographic features, and to include scenic vistas where possible. The roads should generally follow natural contours and slopes to minimize disturbance of drainage patterns. Roads shall be located where they can be maintained and where water management problems are not created. To reduce potential pollution, roads shall be located away from watercourses and utilize buffers where possible to protect water bodies.

Alignment - The gradient and horizontal alignment shall be adapted to the intensity of use, mode of travel, the type of equipment and load weights, and the level of development.

Grades normally should not exceed 10 percent except for short lengths. Maximum grades of 18 percent should only be exceeded if necessary for special uses such as logging roads, field access roads, fire protection roads or other roads not accessible for use by the general public.

For stream crossings, the road should be aligned so that it crosses perpendicular to the channel as much as possible.

Width - The minimum width of the roadbed is 14 ft for one-way traffic and 20 ft for two-way traffic. The roadbed width includes a tread-width of 10 feet for one-way traffic or 16 feet for two-way traffic. Each type of road also requires a minimum of 2 feet of shoulder width on each side of the tread width. Single-lane logging or special-purpose roads can have a minimum width of 10 feet, with greater widths at curves and turnouts. The two-way traffic width shall be increased approximately 4 feet for trailer traffic. The shoulder width may be either gravel or grass. The minimum width of a single lane field road is 10 feet.

Turnouts shall be used on single lane roads where vehicles travel in both directions on a limited basis. Where turnouts are used, road width shall be increased to a minimum of 20 feet for a distance of at least 30 feet.

Types of Field Roads

1. Ingress-egress roads (commonly called connecting roads) are used as the main travel routes into and out of the field and may be constructed on grades as steep as loaded vehicles can travel safely, usually no steeper than 10 percent. These roads should be surfaced with either gravel or asphalt.
2. Diversion roads are placed around the hillside either on a contour or on a grade less than 2 percent. They have a cross-section sloped inward to collect and convey runoff water to a designed outlet. These roads are used mainly during harvest and are usually surfaced with a vegetative cover.
3. Bench roads are constructed either on a contour or a grade less than 2 percent and have a cross-section sloped outward. However, on hillsides where bench roads are constructed, a diversion road is to be constructed to collect the runoff at intervals of 15 feet of vertical distance.
4. Ridge roads (sometimes called fire breaks) are constructed along ridges mainly to control the spread of fire. These roads are always maintained in a "bare" condition.
5. Logging roads are constructed in forested areas to provide management control of forest and removal of logs during timber harvesting.
6. Pasture or rangeland roads are constructed in rangeland to provide for pasture management.

Side slopes - All cuts and fills shall be designed to have stable slopes of a minimum of 2 horizontal to 1 vertical on heights of less than 4 feet. For short lengths, rock areas, or very steep hillsides, steeper slopes may be permitted, if soil conditions warrant and special stabilization measures are installed.

Areas with geological conditions and soils subject to slides shall be avoided or treated to prevent slides.

Drainage - The type of drainage structure used will depend on the intended use and runoff conditions. Culverts, bridges, fords, or grade dips for water management shall be provided at all natural drainageways. The capacity and design shall be consistent with sound engineering principles and shall be adequate for the class of vehicle, type of road, development, or use. When a culvert or bridge is installed in a drainage way, its minimum capacity shall convey the design storm runoff without causing erosion or road overtopping. Table 1 lists minimum design storm frequencies for various road types.

Table 1

Road Type	Storm Frequency
Forest Access Roads, Farm Field Access Roads	2 year - 24 Hour
Farm Driveways, Recreation Facility Access Roads	10 year - 24 Hour
Public Access Roads, Camp grounds, Etc.	25 year - 24 Hour

An erosion-resistant low point or overflow area may be constructed across the access road to supplement culvert capacity on non-public use roads. Culverts, bridges, fords and hardened overflow areas should be installed so the road crossing does not significantly impact fish migration.

Roadside ditches shall be adequate to provide surface drainage for the roadway and deep enough, as needed to serve as outlets for subsurface drainage. At a minimum, the roadside ditch shall be 1.0 foot below the top of road surface to provide internal drainage. Ditch channels shall be designed to be on stable grades or protected with structures or linings for stability.

Water-breaks or water-bars may be used to control surface runoff on low-intensity use forest, ranch or similar roads. On steep grades where runoff and erosion is anticipated down the road, water bars should be considered. When roads are at cross

slope with the land, waterbars and drop inlets shall be installed across the roadway at intervals. Where water is to be conveyed along the road for more than 150 feet, a protected ditch should be considered. Water bars must be constructed of materials that are compatible with the use and maintenance of the road surface. Water bar discharge areas must be well vegetated or have other erosion resistant materials. See chart for Recommended Spacing of Relief Culverts and Water Bars Based on Soil Type.

Surface crowning can also help direct road runoff into the side drainage ditches. Unobstructed flow into the ditches must be maintained to prevent flows from causing roadside erosion. Provide a turnaround at the end of dead end roads. In some areas, turnarounds may also be desirable for stream, lake, recreation, or other access purposes.

To convey water down a hillside, the installation of Grassed Waterway (412) or Underground Outlet (620) will be necessary. In order to reduce sediment pollution, it may be necessary to construct Sediment Basins (350). These measures are to be designed according to the applicable practice standard.

Surfacing - Access roads shall be given a wearing course or surface treatment if required by traffic needs, soil, climate, erosion control, or dust control. The type of treatment, if needed, depends on local conditions, available materials, and the existing road base. If these factors or the volume of traffic is not a problem, no special treatment of the surface is required. On weak bearing capacity soils such as silts, organics, and clays, the surface treatment should be underlain with a geotextile material specifically designed for road stabilization applications when the road is used on a regular basis.

Unsurfaced roads may require controlled access to prevent damage or hazardous conditions during adverse climatic conditions. Toxic and acid-forming materials shall not be used on roads. This should not be construed to prohibit use of chemicals for dust control and snow and ice removal after considering potential impacts on stabilizing vegetation.

Construction Operations - Construction operations should be carried out in such a manner that erosion and air and water pollution are minimized and held within legal limits. Construction shall include the following requirements as necessary for the job:

1. Trees, stumps, roots, brush, weeds, and other objectionable material shall be removed from the work area.
2. Unsuitable material shall be removed from the roadbed area.
3. Grading, sub-grade preparation, and compaction shall be done as needed.
4. Surfacing shall be done as needed.

Traffic safety - Passing lanes, turnouts, guardrails, signs, and other facilities as needed for safe traffic flow shall be provided. Traffic safety shall be a prime factor in selecting the angle and grade of the intersection with public highways. Preferably, the angles shall be not less than 85 degrees. The public highway shall be entered either at the top of a hill or far enough from the top or a curve to provide visibility and a safe sight distance. The clear sight distance to each side shall not be less than 300 feet or as required by local regulations.

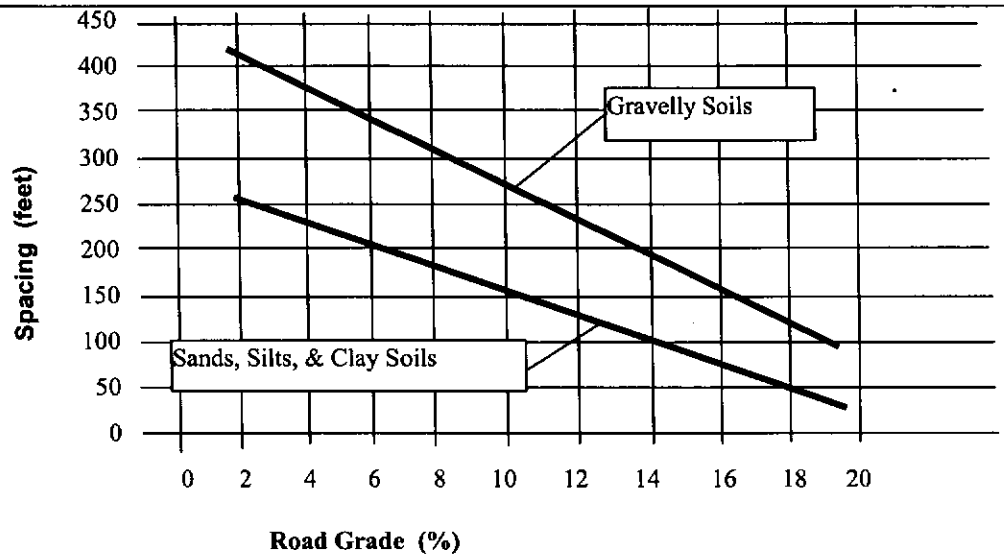
The turning radius of roads shall consider the minimum radius of the farm equipment or trucks that are expected to use the road.

Erosion control - If soil and climatic conditions are favorable, roadbanks and disturbed areas shall be vegetated as soon as possible and skid trails, landings, logging, and similar roads shall be vegetated after harvesting or seasonal use is completed (see Critical Area Planting). If the use of vegetation is precluded and protection against erosion is needed, protection shall be provided by non-vegetative materials, such as gravel or other organic or inorganic material (see Mulching), or in accordance with local regulations.

Roadside channels, cross drains, and drainage structure inlets and outlets shall be designed to be stable (see Structure for Water Control). If protection is needed, riprap or other similar materials shall be used.

RECOMMENDED SPACING FOR RELIEF CULVERTS AND WATER BARS

BASED ON SOIL TYPES



Watercourses and water quality shall be protected during and after construction by erosion-control facilities and maintenance. Filter strips, water and sediment control basins, and other conservation practices shall be used and maintained as needed.

CONSIDERATIONS

Consider visual resources and environmental values during the planning and designing of the road system.

Access roads should be located where minimal adverse impacts will affect wetlands, waterbodies and wildlife habitat. Consideration should be given to the following:

Air Quality Considerations

To reduce impaired air quality from dust from access roads, consideration should be given to the following:

- Effects from untreated, unpaved roads during harvest or heavy use periods;
- Effects from excessive speed and uncontrolled access on unpaved access roads;
- Effects from lack of dust control during construction of roads.

Cultural Resources Considerations

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location.

Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened, or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service,

National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements worksheet.

Water Quantity

- Effects on downstream flows or aquifers that would effect other water uses or users.
- Effects on the volume and timing of downstream flow to prohibit undesirable environmental, social, or economic effects.
- Effects on snowcatch and melt on water budget components.

Water Quality

The type of construction, maintenance, and the road's location determine the road's effect on water quality. When the access road is located across the slope, the runoff from the area upslope of the road may be retarded in the roadside ditches. This may cause sediment to be deposited in the ditch and along the roadside, reducing sediment delivery to the receiving waters. Runoff from the area downslope of the road may not be affected except where the road culverts or low water crossings may concentrate the discharge of the runoff from an uphill area. This may result in a higher carrying capacity of the outlet channel resulting in increased bank and channel erosion and direct transport of this detached sediment, deicing salts and related pollutants. There may be a concentration of pollutants in the roadside ditches, increased infiltration, and an increase in soluble chemicals being percolated into the soil water and into the ground water. Watch for:

- Short-term and construction-related effects of this practice on the quality of on-site downstream water courses;
- Overall effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances that would be carried by runoff from construction activities;
- Effects on the visual quality of water resources.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing access roads shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan will be developed and carried out for the life of the practice:

1. Inspect culverts, roadside ditches, water bars, and outlets after each major runoff event and restore flow capacity as needed.
2. Maintain vegetated areas in adequate cover. Re-seed and mow as needed.
3. Fill low areas in travel treads and re-grade, as needed, to maintain road cross section.
4. Inspect roads with water-bars periodically to insure proper cross section is available and outlets are stable.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

560 - ACCESS ROAD

I. SCOPE

The work shall consist of constructing a road to the lines and grades shown on the drawings.

II. CLEARING

Trees, stumps, roots, brush, weeds, and other objectionable material shall be removed from the work area. The limits of clearing will be marked by means of stakes, flags, or tree markings in the field. All combustible material residue from clearing shall be burned, buried, or piled in designated disposal areas. Burning shall be performed according to local regulations.

III. CUTS AND FILLS

All excavation shall be made to the cut slopes and grades. Suitable materials from excavation are to be used in earthfills. The earthfill shall be placed in layers not to exceed 8 inches and compacted to same density as the undisturbed materials. Should the fill material be either too wet or too dry, the moisture shall be adjusted by allowing the material to dry or by adding water so that the fill material has the proper moisture content as determined by the Engineer.

Prior to placing any earthfill, all unsuitable material shall be removed and the surface compacted.

IV. SURFACING

After completion of cuts and fills, the road surface shall be graded smooth, culverts and/or water crossings installed and then surfaced.

Surfacing, when specified, shall be accomplished by placing 3 inches of gravel over the road surface.

V. STRUCTURES FOR WATER CONTROL

Culverts of sizes and lengths specified shall be placed at the locations and grades as shown on the drawings. The installation shall conform to the requirements of Construction Specification, Structure for Water Control (CMP Conduit).

When rock riprap or grouted rock is specified, these measures will be installed to conform to the requirements of the Construction Specification for these practices.

VI. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

VII. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

VIII. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained access road is an asset to your farm. This access road was designed and installed as a travelway on your farm. The estimated life span of this system is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Here are some recommendations to help

you develop a good operation and maintenance program.

Maintain the roadway surface in a good condition, which includes periodic grading.

Prevent surface ponding by grading to remove depressions.

Limit livestock use to periods that permit usage without damage.

If fences are installed, they shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Removal of debris or blockage of stream crossings culverts or bridges.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Immediately repair any vandalism, vehicular, or livestock damage to any earthfills, spillways, or outlets or other apparatuses.

Other items specific to your project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

ANIMAL TRAILS AND WALKWAYS
(Ft.)
CODE 575

DEFINITION

Established lanes or travel ways that facilitate animal movement.

PURPOSES

- Provide or improve access to forage, water, working/handling facilities, and/or shelter,
- Improve grazing efficiency and distribution, and/or
- Protect ecologically sensitive, erosive and/or potentially erosive sites.

CONDITIONS WHERE THIS PRACTICE APPLIES

On lands where control of animal movement is needed to facilitate access, improve grazing, prevent erosion, and/or protect ecologically sensitive areas.

CRITERIA

General Criteria Applicable to All Purposes

All planned work shall comply with all federal, state, and local laws and permit conditions and requirements. The landowner shall obtain all necessary permits prior to construction or any land clearing activities.

Location. Animal trails or walkways shall be located to make the best use of topographic features. Trails shall generally follow natural contours to the extent practical and minimize disturbance of drainage patterns.

Drainage and Erosion Control. Provisions shall be made for surface and subsurface drainage, as needed, and for disposal of runoff water without causing excessive erosion.

Culverts, bridges, fords, or rolling dips shall be provided at all natural drainageways as appropriate. The capacity and design shall be consistent with sound engineering principles and shall be adequate for the intended use. When a culvert or bridge is installed in a drainageway, its minimum capacity shall convey the 10-year 24-hour design storm runoff without causing erosion or overtopping.

Trails shall be constructed in such a manner that accelerated erosion of the trail surface will not occur:

- Avoid excessively steep pitches and geologically unstable or otherwise highly erodible terrain.
- Outslope construction along hillsides shall be used whenever possible. Additional drainage measures such as water bars, rolling dips or subdrainage shall be used as needed.
- When inslope or crowned construction is required, inboard ditches with sufficient capacity and erosion protection shall be constructed. Additional measures shall be installed as needed to convey ditch flows across the road without excessive erosion.

Dimensions and Surface Materials. Animal trails or walkways shall be constructed wide enough to accommodate movement of animals and access by operator for management and maintenance.

Sensitivity of the animal's feet, with respect to the intended purpose of the trail or walkway, will be included as a design parameter in selecting the surface material for trails or walkways.

Trails or walkways seeded or planted to vegetative cover will be protected from grazing until the vegetation is fully established and capable of withstanding grazing and/or trampling. Vegetative cover shall be established in accordance with Conservation Practice Standard 342, Critical Area Planting. Where maintaining vegetative cover is necessary but not possible, Conservation Practice Standard 561, Heavy Use Area Protection, will be used to provide adequate surface protection.

Additional Criteria Applicable to Providing or Improving Access to Forage, Water, Working/Handling Facilities and/or Shelter

Trails and walkways will be designed and constructed of sufficient size to accommodate the expected frequency of use and animal type(s) planned for the operation.

Conservation practice standard 382, Fence, will be used when needed to keep animals confined to the trail or walkway until the desired destination is reached.

When needed to facilitate movement of animals through a series of paddocks or pastures, gate openings and lane layouts shall allow for efficient flow of animals with the least amount of stress.

Additional Criteria Applicable to Improving Grazing Efficiency and Distribution

Fenced or unfenced animal trails or walkways will be used to distribute grazing to overcome terrain features causing uneven grazing distribution and pressure.

Additional Criteria Applicable to Protection of Ecologically Sensitive Areas.

Cultural resources, threatened and endangered species, wetlands, streambanks, floodways or other ecologically sensitive areas, and areas of special scenic value will be protected through the proper design of trail(s) or walkway(s).

CONSIDERATIONS

Other practices that facilitate grazing distribution and proper intensity and reduce potential erosion should be implemented along with this practice as appropriate:

- Conservation Practice Standard 528A, Prescribed Grazing, can be used to further improve grazing distribution and pressure.
- Conservation Practice Standard 472, Use Exclusion, and other conservation practices can be used in conjunction with trails or walkways to minimize the impact on sensitive areas.
- For areas of high livestock concentration, such as around ponds, tanks, troughs, or other feeding areas, use Conservation Practice Standard 561, Heavy Use Area Protection.
- For travelways used by vehicles or equipment for purposes other than management and maintenance of animal trails or walkways, use Conservation Practice Standard 560, Access Road.
- Consider salting, water development, or other methods to facilitate proper grazing distribution.

Water Quantity

1. Avoid locations and layouts that would result in diversion of surface runoff and other hydrologic modifications that could alter flow paths, modify channel hydrology, and/or trigger concentrated flow erosion or mass wasting.
2. Where applicable, consider the effects of snowcatch and melt on the water budget.

Water Quality

1. Improving grazing distribution using this practice in combination with others should improve water quality, although increased bedding on the walkways will increase manure concentrations locally.
2. If this practice is used to gain livestock access to previously inaccessible water sources, the water quality of those sources may be degraded by increased livestock use. Prescribed Grazing, Fencing or other livestock management measures may be needed to prevent excessive degradation.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, NOAA Fisheries (formerly the National Marine Fisheries Service) and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will

not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that critical periods, such as spawning, eggs in gravels, and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Cultural Resources

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

PLANS AND SPECIFICATIONS

Plans and specifications for installing animal trails and walkways shall be in keeping with this standard. A site-specific design and construction plan is required to describe the requirements for applying this practice to achieve its intended purpose.

Plans and specifications shall include construction plans, drawings, job sheets, or other similar documents. These documents shall specify the requirements for installing the practice, including the location and the kind, amount, and quality of materials to be used.

OPERATION AND MAINTENANCE

The operation and maintenance (O&M) plan shall specify that the trails or walkways and associated practices be inspected annually and after significant storm events to identify repair and maintenance needs.

The O&M plan shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice. These repairs should include, but are not limited to, the following:

- Periodic grading or re-shaping trails or walkways to maintain the designed grade and dimensions;
- Periodic addition of surfacing materials where used;
- Re-seeding of areas in which the vegetation has been damaged or destroyed;
- Mending of fences and replacement of gates; and/or

Periodic removal and management of manure accumulations will be addressed in the O&M plan.

For multiple adjacent vegetated walkways, the O&M plan should provide guidance as to the rotation of walkways to allow for recovery of vegetation and for improvement of traffic -supporting conditions.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

575 - ANIMAL TRAILS AND WALKWAYS

I. SCOPE

The work shall consist of constructing animal trails and/or walkways to meet the practice purpose at the location(s). Construction shall follow the lines and grades as shown on the drawings (plans) and/or as staked in the field.

II. TRAILS AND WALKWAYS

The following items shall govern the construction of the trails and walkways:

- Minimum width:
    1. Open grass, grass-oak: two (2) feet for livestock and foot trails
    2. Six (6) feet for small vehicles
    3. Dense tree thickets or brush: nine (9) feet
- Maximum allowable grade: 20 percent, except for short distances where necessary to bypass dangerous areas or barriers.
- Angle of switchback turns in the trail should not exceed 135 degrees.
- Avoid trails in canyon bottoms, washes or draws, and across historic and recent landslide areas.
- Construct cross ditches or dips, as needed, to turn water off the trail to prevent erosion.
- Stream crossings should be located where stream reaches have a stable bottom and where flows are low and shallow. Crossing sites that have stable, gently sloping banks are most desirable.
- Culverts, fords, or bridges shall be installed across intermittent or perennial drainageways.
- Minimum width of bridge when needed: six (6) feet, excluding side rails. If the bridge is to be utilized by vehicles, consult with a qualified professional engineer.

III. Additional Requirements

- All work shall be done in accordance with proper safety codes for the type of construction being performed, with due regards to the safety of all persons and property.
- Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held to within legal limits.

IV. BASIS FOR ACCEPTANCE

After the trail or walkway has been completed, an on-site inspection will be conducted to determine if the practice has been applied to conform to the specifications.

V. OPERATION AND MAINTENANCE

The landowner should provide the necessary maintenance to assure the trails and walkways are functional:

- Maintain the trail in good condition, which includes periodic grading and repair of the surface;
- Remove debris to prevent blockages of stream crossings, culverts, or bridges;
- Remove stones, stumps, fallen trees, earth slides, and other obstructions that interfere with livestock use.
- Immediately repair any damage from vandalism, vehicles, livestock, or burrowing animals.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

CRITICAL AREA PLANTING

(acre)
CODE 342

DEFINITION

Planting vegetation, such as trees, shrubs, vines grasses, or legumes, on highly erodible or critically eroding areas (does not include tree planting mainly for wood products).

PURPOSES

To stabilize the soil, reduce damage from sediment and runoff to downstream areas, and improve wildlife habitat and visual resources.

CONDITIONS WHERE PRACTICE APPLIES

On highly erodible or critically eroding areas that cannot be stabilized by ordinary conservation treatment and management and if left untreated can cause severe erosion or sediment damage. Examples of applicable areas are *sand dunes*, dams, dikes, mine spoil, levees, cuts, fills, surface-mined areas, and denuded or gullied areas where vegetation is difficult to establish by usual planting methods.

CRITERIA

Selected plants, numbers, seeding mixtures and rates shall be in conformance with the respective Major Land Resource Area (MLRA) Vegetative Guide in Section II of the Field Office Technical Guide.

Based on bag tags, adjust seeding rates at the field site to insure the required amount of pure live seed (PLS)(germination x purity). Do not include any hard seed in the percent germination. When coated seed is used, adjust seeding rate to compensate for the weight of coating.

Use straw mulch on plantings made in summer and when animal or foot traffic is expected to interfere.

CONSIDERATIONS

These sites are generally severely eroded or disturbed and have low fertility and few, if any, resident seeds. High seeding and fertilizer rates are needed to insure adequate vegetative cover.

Stabilized sites are expected to have locally adapted species invade the site and provide long-term stability.

When sites are reshaped, creating smooth hard surfaces on final grading causes compaction and makes it difficult to prepare a good seedbed.

The horizontal indentations left by tracked equipment provides a suitable seedbed on steep slopes.

Most California soils are low in sulfur. Preference should be given to fertilizers with this element. Ammonium Phosphate Sulfate 16-20-0 contains 15 percent sulfur and is the preferred fertilizer when seeding mixtures of grasses and legumes.

Straw is the preferred mulch but needs to be anchored in place. Rollers and crimpers can be pulled on slopes up to 3 to 1. Where there is access, equipment can be winched up and down steeper slopes. Tackifiers can be used to anchor the straw when equipment cannot be used on the site.

Use of wheat straw will result in less volunteer grain compared to barley straw.

When using straw grown in the same county, use clean straw to minimize spread of noxious weeds. Encourage users to have straw inspected by the County Agricultural Commissioner.

Use 75 feet as the effective range for straw blowing equipment.

Use 125 feet as the effective range for hydroseeders. When a 100-foot hose is available, the range can be extended up to 200 feet.

When seeding grasses, apply nitrogen at the rate of 80 pounds per acre (500#/acre of 16-20-0) except if soils are coarse sandy, gravelly or granitic, fertilizer rates can be reduced 50 percent.

When seeding legumes, fertilize with the equivalent to 44 pounds per acre of phosphorus (500#/acre of 16-20-0).

When water quality is expected to be adversely impacted by leached fertilizer, reduce fertilizer rates by 50 percent.

When planting perennial grasses, the fertilizer rate can be reduced by 50 percent.

When fertilizer rates are reduced, the balance of the fertilizer needs to be applied at the beginning of the next growing season.

Use hydro-mulch planting on steep, inaccessible sites not suitable for straw mulch planting and on other sites when rain is expected within 60 days following planting; except, do not use when high winds or animal or foot traffic are expected to interfere.

The split hydro-mulch planting can be used when small seeds will be planted on sites suitable for hydromulch planting. Seed and fertilizer are hydroseeded on first to provide better seed to soil contact and then the rest of the wood fiber is hydromulched over the site.

Bermudagrass sprigs and plugs should only be planted in areas having adequate soil moisture throughout the summer. On sloping banks, the first row is at the waterline and additional rows are numbered going up the bank. For water impoundment's with fluctuating water levels, use the average waterline expected during the active growing season.

When plantings are to be irrigated, maintain adequate moisture in the upper six (6) inches of soil during the first four (4) weeks and then in the upper 12 inches thereafter until the rainy season.

Limit human and livestock use of the area as needed to protect the plant cover.

Stabilization of interior and coastal sand dunes

The foredune to be created or stabilized must be a sufficient distance upwind to avoid having the base encroach on the area to be protected as the dune forms or increases in height. Proper distance can be best estimated by observing mature dune dimensions adjacent to the area receiving treatment. Ordinarily 300 to 500 feet of base width will be required.

Interior Sand Dunes

Use both woody and herbaceous types of plantings for permanent vegetative stabilization.

Initial stabilization of active dunes or sand blow areas:

Use wind controlling fences or artificial windbreaks as necessary to still sand on the area to be treated. Fence should be of uniform height placed across the prevailing wind direction. Three to five fences at approximately 50-foot intervals may be required.

Use a mulch to help stabilize the sand until vegetation is established.

Install and test the irrigation system to be used prior to planting.

Make plantings of the woody materials selected at the upwind edge of the area or dunes.

Extend plantings down wind over the dune as new dune area forms.

Establish a solid windbreak of plants at the down wind edge of dunes as soon as possible. See practice 380 - Windbreak / Shelterbelt Establishment.

Introduce long-lived, low maintenance plant species as needed to assure permanent stabilization of the treated area.

Coastal Sand Dunes

Initial Stabilization of active dunes:

If sand fences or artificial windbreaks will be required to still sand movement while establishing beachgrass, select locations for one or more fences beyond the high tidewater mark. Fences to create the foredune will be placed perpendicular to the prevailing wind at uniform height and about 30 feet apart. The fences may require lifting to keep from being buried as the foredune takes shape.

During December, January, or February plant culms of European beachgrass, Ammophilia arenaria or another suitable species to create a foredune or add height to an existing foredune. Where space permits, planting should be extensive enough to provide a dune base width of 400 to 500 feet. The grass culms should be from vigorous young plants harvested to provide at least one underground node

per culm or stem. Tops of the culms should be cut back to 20 inch length for easy handling. The culms will be planted on approximate 18-inch centers, 3 per hill. Planting depth should be about 12 inches with about 8 inches of top protruding above the soil surface. The bundles of plant material must be maintained in live, moist conditions until planted.

Plant from windward to leeward, continuing in annual increments until the total unstable area is under control.

Apply nitrogen fertilizer (preferably 16-20-0) over the planted area at the rate of 20 pounds of nitrogen per acre. Fertilizer applied during gentle rain or irrigated in immediately will prove most effective. Fertilize again at the same rate about three months later. Do not use ammonium sulfate (21-0-0).

Supplemental planting on beachgrass stabilized dunes:

1. During the fall months, introduce adapted and enduring species of trees, shrubs, and other plants into the beachgrass cover using methods that will not damage the cover.

2. Provide protection from rabbits, insects, and disease as necessary during establishment of the supplemental planting.

Careful evaluation is needed to avoid disturbing Ecologically Significant Areas. Dunes often support threatened and/or endangered plants and animals.

Selection of vegetative species should consider local opinion on use of introduced species.

In most areas, irrigation water will be necessary for establishing and maintaining vegetative cover.

Where rainfall is adequate or irrigation water available, barley or sudangrass can be used successfully to grow mulch in place where sand blow areas need such treatment to keep sand from being removed. Also asphalt emulsions and certain other chemicals have been used successfully as spray on materials for temporary sand blow control to permit establishment.

Initial stabilization may require use of board or slat fencing to trap sand while vegetative cover is being established.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that during critical periods, such as spawning, eggs in gravel's, and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

Critical area planting may have a minor effect on the quantity of surface and ground water. If there are large areas involved, as in mined land reclamation, there may be a reduction of surface runoff and increased infiltration and percolation.

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Effects of vegetation management on soil moisture.

3. Effects of snowcatch and melt on the water budget.

4. Effects of increased organic matter on water holding capacity of the soil.

5. Potential for a change in plant growth and transpiration because of changed in soil water volume.

Water Quality

This practice may reduce soil erosion and sediment delivery to surface waters. Plants may take up more of the nutrients in the soil, reducing the amount that can be washed into surface waters or leached into ground water. This practice may reduce wind blown soil delivery to surface waters.

Excessive fertilizer applications can increase the amount of nutrients leached into ground water.

During grading, seedbed preparation, seeding, and mulching, large quantities of sediment and associated chemicals may be washed into surface waters prior to plant establishment.

1. Effects on erosion and the movement of sediment and soluble and sediment-attached substances carried by runoff.

2. Filtering effect of vegetation on movement of sediment and dissolved and sediment-attached substance.

3. Short-term and construction-related effects on downstream water courses.

4. Potential for earth moving to uncover or redistribute toxic materials and effect on water or vegetation.

5. Effects on the use and management of nutrients and pesticides and resulting effects on surface and ground water quality.

6. Effects on the visual quality of downstream water resources.

This practice may reduce wind blown soil delivery to surface waters. Plants may take up more of the nutrients in the soil, reducing the amount that can be washed into surface waters or leached into ground water.

7. Excessive fertilizer applications can increase the amount of nutrients leached into ground water.

PLANS AND SPECIFICATIONS

Plans and specifications are to be prepared for each field or treatment area and include species of grasses, legumes, shrubs, and trees; methods and rates of planting; fertilizer and lime requirements; planting site preparation; time of planting; mulching; and irrigation.

Specify wheat straw rather than barley straw where volunteer growth is not desirable.

When straw mulch cannot be anchored by rollers or crimping equipment, use tackified straw planting. Use caution on decomposed granitic soils since some react adversely to mulch being anchored.

The acceptable time period for obtaining woody cuttings from host plants can be listed on the Practice Requirements sheet.

Specify the best window of time for planting at each site. At higher elevations, this might be August 15 to September 15 to obtain enough growth after the first rain before it gets too cold. September 15 to October 15 is used in some lower elevation areas and October 15 to November 15 in other areas. Wheat and barley can be successfully planted in November and December in some areas. Use local knowledge of the rainfall pattern, temperature, wind conditions, and growth characteristics of the species being planted to determine the window of time for planting.

Identify the water source, method of irrigation, and irrigation water management.

Show the type of fence to use, spacing between fences, and direction of fences and windbreaks on the drawings.

Identify the kind of mulch that will be used, plus the amount and method of anchoring.

Identify the fertilizer to use, application rate, method of applying fertilizer, and timing.

Provide for crowd control, including animals and vehicles.

OPERATION AND MAINTENANCE

Maintenance needed for this practice includes replanting areas with less than 60 percent vegetative cover, periodic fertilizer applications, control of noxious weeds, replacing dead trees and shrubs, periodic inspections of the treatment area, and control of pest infestations.

Equipment will be operated in a safe manner and underground utilities marked before work begins.

Plans must include provisions for excluding people, livestock, and vehicular traffic during and following establishment of vegetative plantings. Recreational use of the planted area must be controlled as necessary to avoid damaging the vegetation.

Long-term provision for maintenance will be needed following the initial planting. Blowouts that require replanting commonly occur during initial establishment. Also, more enduring plants will need to be added after initial stabilization. Occasional applications of nitrogen fertilizer will be required to maintain dense vigorous grass cover.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342A - CRITICAL AREA PLANTING - STRAW MULCH

I. SCOPE

The work shall consist of furnishing all materials and placing them on all exposed, disturbed, or barren areas within the designated areas to the limits as shown on the drawings, or as staked in the field.

II. MATERIALS

Seed

All seed shall be delivered to the site tagged and labeled in accordance with the California Agricultural Code, and shall be acceptable to the County Agricultural Commissioner.

Bag tag figures will be evidence of purity and germination. Time since date of seed test shall not exceed 9 months.

Seed shall be of a quality that weed seed shall not exceed 0.5 percent of the aggregate of pure live seed (PLS) (percent germination x percent purity) and other material.

Fertilizer

Unless otherwise specified on the Practice Requirements sheet, all fertilizer shall be Ammonium Phosphate Sulfate containing a minimum of 16 percent Nitrogen, 20 percent available phosphoric acid and 0 percent water soluble potash and be uniform in composition, dry and free flowing, pelleted or granular.

All fertilizer shall be labeled in accordance with applicable state regulations and bear the warranty of the producer for the grade furnished.

Inoculants

The inoculant for treating legume seeds shall be a pure culture of Nitrogen fixing bacteria prepared specifically for the plant species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer or approved substitute, shall be used to bond the inoculant to the seed. For nonpellet inoculated seed, two times the amount of the inoculant recommended by the manufacturer shall be used and seed shall be sown with 24 hours.

For pellet inoculated seed, at least 30 pounds of inoculant shall be used per 1,000 pounds of raw seed and the seed shall be labeled to show the Lot Number, Expiration Date, and Percent Coat of the finished product. Pellet inoculated seed shall be kept cool and sown within 180 days.

Straw

Straw shall be new straw derived from rice, wheat, oats, or barley that meets the County Agricultural Commissioner's standards for weed pests. Clearance shall be obtained from the County Agricultural Commissioner, as required by law, before straw obtained outside the county in which it is to be used is delivered to the site.

Jute Matting

Jute matting shall be cloth mesh of uniform plain weave of undyed and unbleached jute yarn with a minimum weight of one pound per 10 square feet, and a maximum opening size of 1 inch by 1 inch.

Plastic Netting

Plastic netting shall be a polypropylene extruded plastic netting with square or rectangular openings not greater than 3/4 inches and weight of not less than 2.6 pounds per 1000 square feet.

Excelsior Matting

Excelsior matting shall consist of a machine-produced mat of wood excelsior fiber with consistent thickness and fiber evenly distributed over the entire area of the blanket. At least 70 percent of the fibers shall be 6 inches or longer in length. The topside of each blanket shall be covered with a biodegradable extruded plastic mesh with a maximum opening size of 2-inch by 2-inch.

Staples

Staples shall be made of 0.09 inch diameter or heavier wire, "U" shaped, with legs at least 8 inches in length.

Anchor pins may also be used to anchor jute matting. Anchor pins shall be made of rigid 0.12 inch diameter or heavier galvanized wire with a minimum length of 10 inches for hook or "J" type pins.

III. SEEDING MIXTURE AND PLANTING DATE

The seed(s) and rate(s) specified on the Practice Requirements sheet shall be used.

The seeding rate(s) shall be the weight exclusive of any coating material. Any legume seed used shall be inoculated. Based on bag tags, seeding rates shall be adjusted to insure the required amounts of pure live seed.

Planting shall be performed after final grading is completed unless otherwise specified on the Practice Requirements sheet.

IV. SEEDBED PREPARATION

The area to be planted shall be weed free and have a firm seedbed which has previously been roughened by scarifying, disking, harrowing, chiseling, or otherwise worked to a depth of 2 to 4 inches. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. Seedbed may be prepared at time of completion of earth moving work. The horizontal indentations left by tracked equipment is acceptable on steep slopes.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance shall be removed.

Seedbed preparation shall be suspended when soil moisture conditions are not suitable for obtaining a satisfactory seedbed.

V. FERTILIZING, SEEDING, MULCHING

Fertilizing

Fertilizer shall be distributed uniformly over the seedbed at the rate of 500 pounds per acre unless a different amount is specified on the Practice Requirements sheet.

Fertilizer shall be applied in any way that will result in uniform distribution. The fertilizer shall be incorporated into the soil. Incorporation may be as part of the seedbed preparation, or as part of the seeding operation.

Seeding

Seed shall be drilled or broadcast by hand, mechanical hand seeder, or power operated seeder. Seed shall be incorporated into the soil, but not more than 1 inch deep.

Mulching

A straw covering shall be distributed uniformly over the seeded area within 48 hours after seeding. Straw shall be applied at the rate of 2 tons per acre unless a different amount is specified on the Practice Requirements sheet. The straw shall be applied by hand, blower, or other suitable equipment. If straw is applied by blower, it shall not be chopped in lengths less than 6 inches.

Anchoring the Mulch

The mulch shall be anchored in place using one of the following methods as specified on the Practice Requirements sheet.

Method 1

The straw shall be anchored using hand tools, mulching rollers, straight serrated disks, or similar types of suitable equipment and shall be performed in a satisfactory manner. The straw shall be tucked in a minimum of 3 inches on a spacing not to exceed one foot in both directions.

Method 2

The straw shall be anchored in place by the placement of jute matting or excelsior matting. The matting shall be applied up and down the slope and shall continue beyond the edge of the mulched or seeded area at least 1 foot at the sides and at the top and bottom of the mulched area. If existing vegetation or structures mark the boundaries of the area, the matting shall be continued into the stable vegetated area or to the edge of the structure. The matting shall be cut around objects so it will lay flat on the soil surface.

The upper end of the matting at the top of the area shall be buried in a trench at least 6 inches deep. Sides of rolls shall overlap at least 4 inches, and rolls shall

overlap at least 3 feet where an uphill roll joins a downhill roll. The uphill roll shall overlie the downhill roll.

Staples shall be installed perpendicular to the slope and shall be spaced approximately 5 feet apart down the sides in the overlap area and center of the roll. Staples spaced not more than 1 foot apart shall be installed across the upper end of each roll and across the overlap area where an uphill roll joins a downhill roll.

Method 3

The straw mulch shall be anchored in place by covering the mulch with plastic netting. The netting shall be applied up and down the slope, and shall continue beyond the edge of the mulched area at least 1 foot at the sides and at the top and bottom of the area.

The upper end of the netting at the top of the area shall be buried in a trench at least 6 inches deep. Sides of rolls shall overlap at least 4 inches and rolls shall overlap at least 3 feet where an uphill roll joins a downhill roll. The uphill roll shall overlie the downhill roll.

Staples shall be installed perpendicular to the slope and shall be spaced 5 feet apart in both directions. The staples on the exterior edges of the netting shall be spaced 5 feet apart.

Method 4

No anchoring is required.

VI. IRRIGATION

When specified, irrigation water shall be applied during the establishment period at the times and rates as listed on the Practice Requirements sheet.

VII. OTHER REQUIREMENTS

Other details for the establishment and maintenance of the plants including, but not limited to, the need for livestock and traffic control shall be applied when specified on the Practice Requirements sheet.

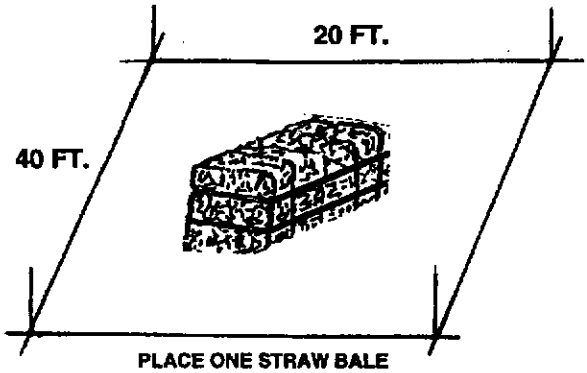
Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

Operations shall be done in such a manner that soil erosion and air and water pollution are minimized and held within legal limits.

The owner, operator, contractor, or other persons shall conduct all work and operations in accordance with proper safety codes for the type of work being performed with due regards to the safety of all persons and property.

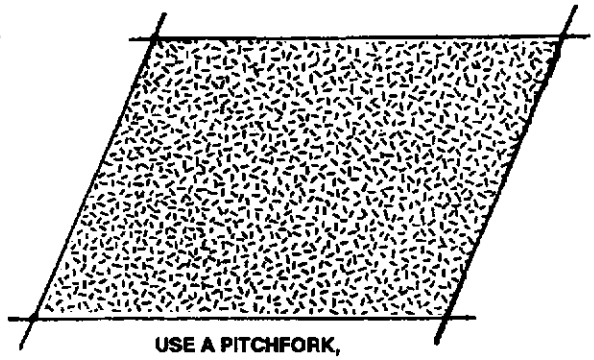
SPREAD THE STRAW

MARK OFF 800 SQ FT. PLOTS



PLACE ONE STRAW BALE PER PLOT (~74 POUNDS). THIS IS EQUIVALENT TO 2 TONS PER ACRE.

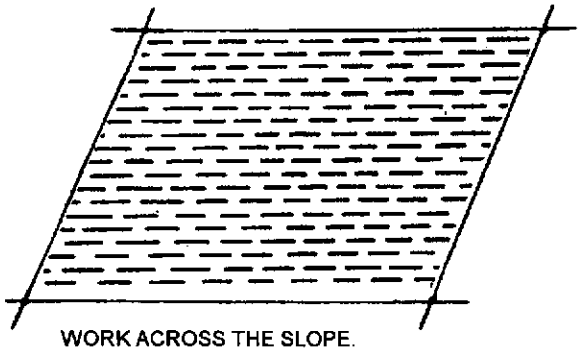
SPREAD EVENLY



USE A PITCHFORK, SPADING FORK, OR BY HAND

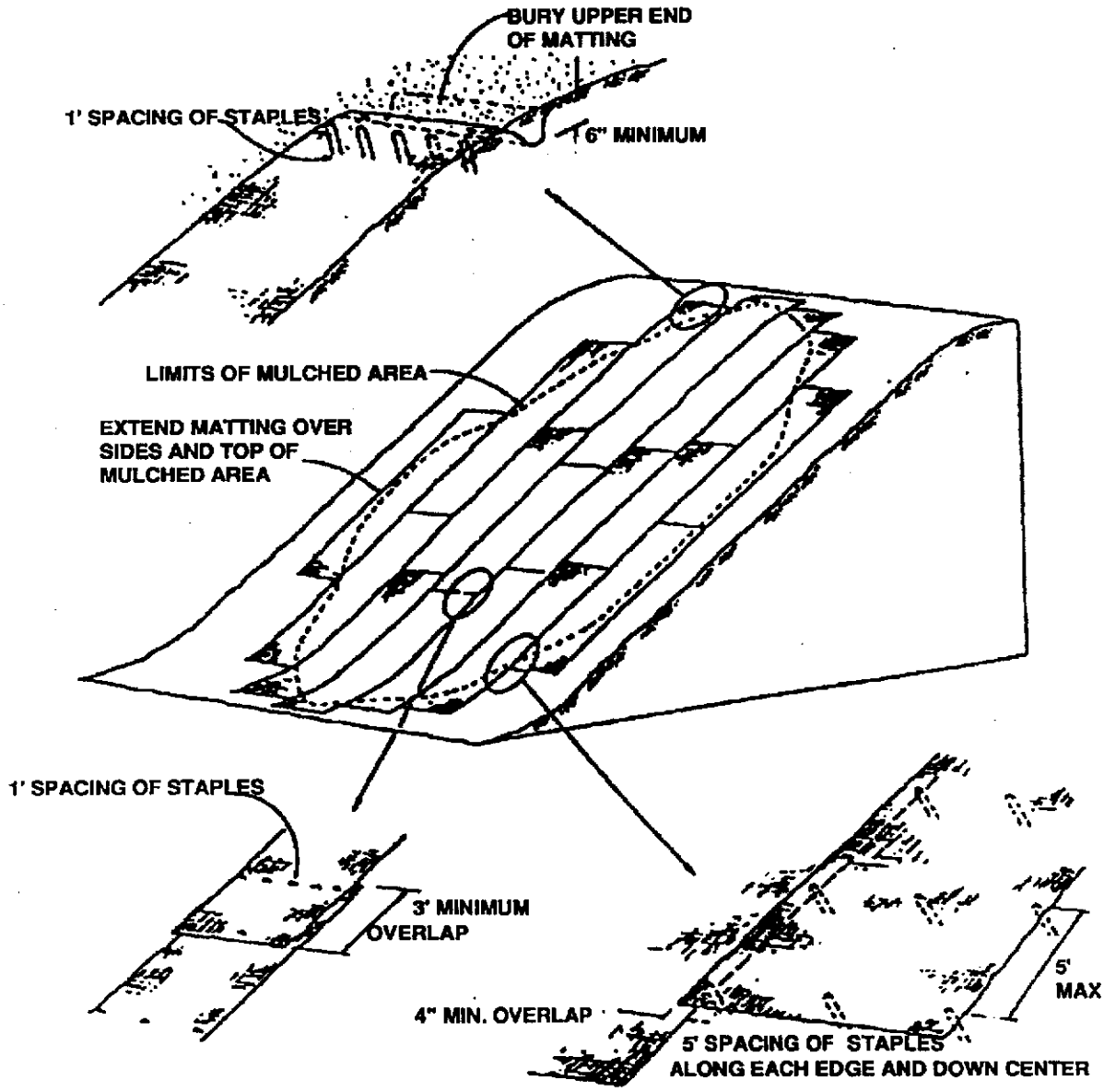
ANCHOR THE STRAW - METHOD 1

CRIMP BY HAND



WORK ACROSS THE SLOPE.
PUNCH STRAW 3 TO 4 INCHES DEEP.
A SQUARE END SPADE WORKS WELL.
MAKE PUNCH EVERY 12 INCHES.

ANCHOR THE STRAW - METHOD 2

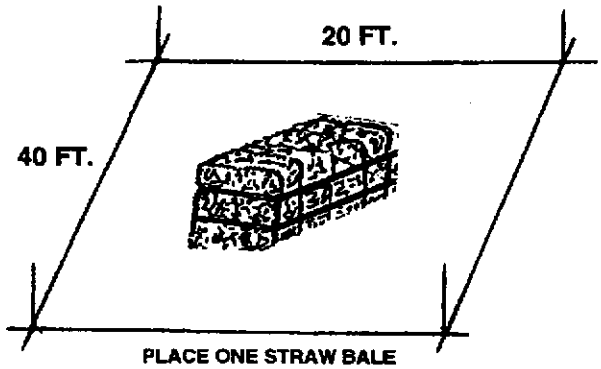


DRAWING 342A - 2

ANCHOR THE STRAW - METHOD 2

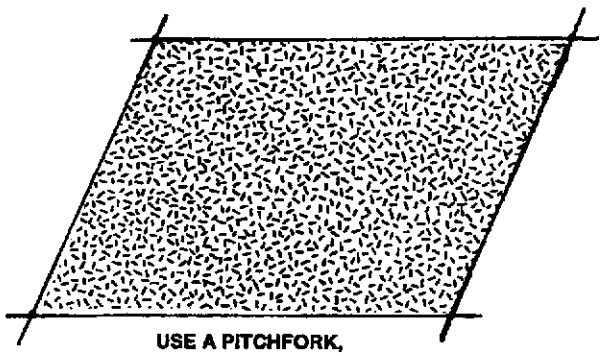
SPREAD THE STRAW

MARK OFF 800 SQ FT. PLOTS



PLACE ONE STRAW BALE PER PLOT (~74 POUNDS). THIS IS EQUIVALENT TO 2 TONS PER ACRE.

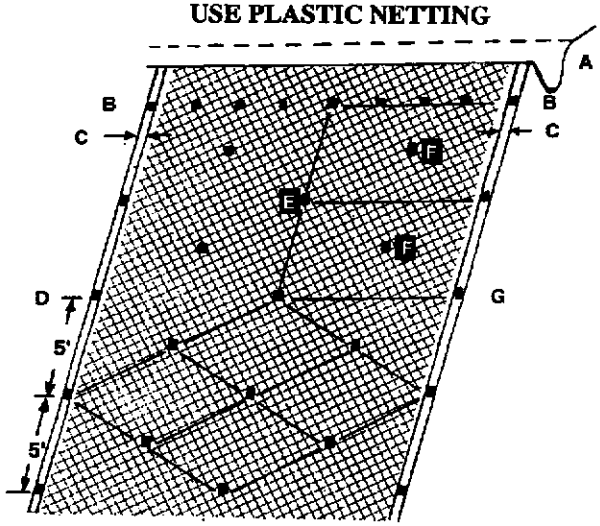
SPREAD EVENLY



USE A PITCHFORK, SPADING FORK, OR BY HAND

ANCHOR THE STRAW - METHOD 3

USE PLASTIC NETTING



A. LAY BIRD CONTROL NETTING OR SIMILAR MATTING IN STRIPS DOWN THE SLOPE OVER THE STRAW. BURY UPPER END IN 6-8 INCH DEEP AND WIDE TRENCH. MOST NETTING COMES IN 14 TO 17 FT. WIDE ROLLS.

B. SECURE THE UPPER END WITH STAKES EVERY 2 FEET.

C. OVERLAP SEAMS ON EACH SIDE 4-5 INCHES.

D. SECURE SEAMS WITH STAKES EVERY 5 FEET.

E. STAKE DOWN THE CENTER EVERY 5 FEET.

F. STAKE MIDDLES TO CREATE DIAMOND PATTERN THAT PROVIDES STAKES SPACED 4-5 FEET APART.

G. USE POINTED 1X2 INCH STAKES 8 TO 9 INCHES LONG. LEAVE 1 TO 2 INCH TOP ABOVE NETTING, OR USE "U" SHAPED METAL PINS AT LEAST 9 INCHES LONG.

NOTE WHEN JOINING TWO STRIPS, OVERLAP UPPER STRIP 3 FEET OVER LOWER STRIP AND SECURE WITH STAKES EVERY 2 FEET LIKE IN "B" ABOVE.

DRAWING 342A - 3

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342B - CRITICAL PLANTING AREA - HYDRO MULCH

I. SCOPE

The work shall consist of furnishing all materials and placing them on all exposed, disturbed, or barren areas within the project area or site to the limits as show on the drawings or as staked in the field.

II. MATERIALS

Seed

All seed shall be delivered to the site tagged and labeled in accordance with the California Agricultural Code, and shall be acceptable to the County Agricultural Commissioner.

Bag tag figures will be evidence of purity and germination. Time since date of seed test shall not exceed 9 months.

Seed shall be of a quality that weed seed shall not exceed 0.5 percent of the aggregate of pure live seed (PLS) (percent germination x percent purity) and other material.

Fertilizer

Unless otherwise specified on the Practice Requirements sheet, all fertilizer shall be Ammonium Phosphate Sulfate containing a minimum of 16 percent Nitrogen, 20 percent available phosphoric acid and 0 percent water soluble potash and be uniform in composition, dry and free flowing, pelleted or granular.

All fertilizer shall be labeled in accordance with applicable state regulations and bear the warranty of the producer for the grade furnished.

Inoculants

The inoculant for treating legume seeds shall be a pure culture of Nitrogen fixing bacteria prepared specifically for the plant species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer or approved substitute, shall be used to bond the inoculant to the seed. For nonpellet inoculated seed, two times the amount of the inoculant recommended by the manufacturer shall be used and seed shall be sown with 24 hours.

For pellet inoculated seed, at least 30 pounds of inoculant shall be used per 1,000 pounds of raw seed and the seed shall be labeled to show the Lot Number, Expiration Date, and Percent Coat of the finished product. Pellet inoculated seed shall be kept cool and sown within 180 days.

Wood Fiber

Wood fiber shall be a wood cellulose fiber that contains no germination nor growth inhibiting factors. The wood fiber shall be produced from nonrecycled wood such as wood chips or similar wood materials and shall have the property to be evenly dispersed and suspended when agitated in water. It shall be colored with a nontoxic water soluble green dye to provide a proper gauge for metering of material over ground surfaces.

The wood fiber mulch may also be produced from the following materials:

a. recycled wood fiber, such as wood chips or similar wood materials

b. a combination of recycled newsprint and cardboard materials that contain at least 50 percent cardboard, or

c. a combination of recycled newsprint and non-recycled wood fiber or recycled wood fiber materials that does not contain more than 50 percent newsprint

Tackifier

Tackifier material shall be one of the following or other material specified on the Practice Requirements sheet and shall have the property to be evenly dispersed and suspended in water when agitated: M-Binder, Sentinel, Ecotak-SAT, Fish-STIK, and Soil Master WR.

III. SEEDING MIXTURE AND PLANTING DATE

The seed(s) and rate(s) specified on the Practice Requirements sheet shall be used. The seeding rate(s) shall be the weight exclusive of any coating material. Any legume seed used shall be inoculated. Based on bag tags, seeding rates shall be adjusted to insure the required amounts of pure live seed.

Planting shall be performed after final grading is completed unless otherwise specified on the Practice Requirements sheet.

IV. SEEDBED PREPARATION

The area to be planted shall be weed free and have a firm seedbed which has previously been roughened by scarifying, disking, harrowing, chiseling, or otherwise worked to a depth of 2 to 4 inches. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. Seedbed may be prepared at time of completion of earth moving work.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance shall be removed.

Seedbed preparation shall be suspended when soil moisture conditions are not suitable for obtaining a satisfactory seedbed.

V. FERTILIZING, SEEDING, MULCHING

Fertilizing

Fertilizer shall be distributed uniformly over the seedbed at the rate of 500 pounds per acre unless a different amount is specified on the Practice Requirements sheet.

Fertilizer shall be applied hydraulically by hydroseeder in the form of a slurry that also contains the required seed. Fertilizer shall not remain in the slurry longer than two (2) hours.

Seeding and Mulching

Seed shall be distributed uniformly in a water slurry by hydroseeder.

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous slurry and a discharge system which will apply the slurry to the slopes at a continuous and uniform rate.

Seed shall not remain in the slurry longer than thirty (30) minutes. The slurry shall also contain wood fiber at the rate of 1500 pounds per acre, tackifier, and the required fertilizer unless otherwise specified on the Practice Requirements sheet. The wood fiber shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The application rate of the tackifier shall be:

Tackifier	Rate	Wood Fiber Mulch
M-Binder	100lbs	1,500 to 2,000lbs
Sentinel	100lbs	1,500 to 2,000lbs
Ecotak-SAT	100lbs	1,500 to 2,000lbs
Fish-STIK	100lbs	1,500 to 2,000lbs
Soil Master WR	100gal	2,000 to 2,500lbs

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts. The slurry shall be applied uniformly over the site at a rate that is nonerosive and minimizes runoff.

VI. IRRIGATION

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet.

VII. SPECIAL MEASURES

Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

Other details for the establishment and maintenance of the plants including, but not limited to, the need for livestock and traffic control shall be applied when specified on the Practice Requirements sheet.

Operations shall be done in such a manner that erosion and air and water pollution are minimized and held with legal limits.

The owner, operator, contractor, or other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342E - CRITICAL AREA PLANTING - EROSION CONTROL BLANKET

I. SCOPE

The work shall consist of furnishing all materials and placing them on all exposed, disturbed, or barren areas within the project area or site to the limits as shown on the drawings, or as staked in the field.

II. MATERIALS

Seed

All seed shall be delivered to the site tagged and labeled in accordance with the California Agricultural Code, and shall be acceptable to the County Agricultural Commissioner.

Bag tag figures will be evidence of purity and germination. Time since date of seed test shall not exceed 9 months.

Seed shall be of a quality that weed seed shall not exceed 0.5 percent of the aggregate of pure live seed (PLS) (percent germination x percent purity) and other material.

Fertilizer

Unless otherwise specified on the Practice Requirements sheet, all fertilizer shall be Ammonium Phosphate Sulfate containing a minimum of 16 percent Nitrogen, 20 percent available phosphoric acid and 0 percent water soluble potash and be uniform in composition, dry and free flowing, pelleted or granular.

All fertilizer shall be labeled in accordance with applicable state regulations and bear the warranty of the producer for the grade furnished.

Inoculants

The inoculant for treating legume seeds shall be a pure culture of Nitrogen fixing bacteria prepared specifically for the plant species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer or approved substitute, shall be used to bond the inoculant to the seed. For nonpellet inoculated seed, two times the amount of the inoculant recommended by the manufacturer shall be used and seed shall be sown within 24 hours.

For pellet inoculated seed, at least 30 pounds of inoculant shall be used per 1,000 pounds of raw seed and the seed shall be labeled to show the Lot Number, Expiration Date, and Percent Coat of the finished product. Pellet inoculated seed shall be kept cool and sown within 180 days.

Wood Fiber

Wood fiber shall be a wood cellulose fiber that contains neither germination nor growth inhibiting factors. The wood fiber shall be produced from nonrecycled wood such as wood chips or similar wood materials and shall have the property to be evenly dispersed and suspended when agitated in water. It shall be colored with a nontoxic water-soluble green dye to provide a proper gauge for metering of material over ground surfaces.

The wood fiber mulch may also be produced from the following materials:

a. recycled wood fiber, such as wood chips or similar wood materials

b. a combination of recycled newsprint and cardboard materials that contain at least 50 percent cardboard, or

c. a combination of recycled newsprint and non-recycled wood fiber or recycled wood fiber materials that does not contain more than 50 percent newsprint

Erosion Control Blanket

The erosion control blanket shall consist of a machine-produced mat of wood excelsior fiber with consistent thickness and fiber evenly distributed over the entire area of the blanket. At least 70- percent of the fibers shall be six (6) inches or longer in length. The topside of each blanket shall be covered with biodegradable

extruded plastic mesh with openings not exceeding two inches by two inches.

Erosion control blankets may also be machine produced mats of 70 percent wheat straw and 30 percent coconut fiber or 100 percent coconut fiber with consistent thickness and fiber evenly distributed over the entire area of the blanket. These blankets shall have a minimum density of 0.5 pounds per square yard and be enclosed in netting material.

Staples

Staples shall be "U" shaped with legs at least ten (10) inches in length and have a two (2) inch crown and shall be made of eleven (ll) gauge or heavier wire.

III. SEEDING MIXTURE AND PLANTING DATE

The seed(s) and rate(s) specified on the Practice Requirements sheet shall be used. The seeding rate(s) shall be the weight exclusive of any coating material. Any legume seed used shall be inoculated. Based on bag tags, the seeding rates shall be adjusted to insure the required amounts of pure live seed.

Planting shall be performed after final grading is completed unless otherwise specified on the Practice Requirements sheet.

IV. SEEDBED PREPARATION

The area to be planted shall be weed free and have a firm seedbed which has previously been roughened by scarifying, disking, harrowing, chiseling, or otherwise worked to a depth of 2 to 4 inches. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. Seedbed may be prepared at time of completion of earth moving work.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance shall be removed.

Seedbed preparation shall be suspended when soil moisture conditions are not suitable for obtaining a satisfactory seedbed.

V. FERTILIZING, SEEDING, MULCHING

Fertilizing

Fertilizer shall be distributed uniformly over the seedbed at the rate of 500 pounds per acre unless a different amount is specified on the Practice Requirements sheet.

Fertilizer shall be applied in any way that will result in uniform distribution. When specified on the Practice Requirements sheet, fertilizer shall be incorporated into the soil as part of the seedbed preparation or as part of the seeding operation.

Fertilizer shall be applied hydraulically by hydroseeder in the form of a slurry that also contains the required seed. Fertilizer shall not remain in the slurry longer than two (2) hours.

Seeding

Seed shall be drilled, broadcast, or distributed uniformly in a water slurry by hydroseeder. When specified on the Practice Requirements sheet, seed shall be incorporated into the soil but not more than the specified depth.

The hydroseeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous slurry and a discharge system that will apply the slurry to the slopes at a continuous and uniform rate.

Seed shall not remain in the slurry longer than thirty (30) minutes. The slurry shall also contain wood fiber at the rate of 500 pounds per acre and the required fertilizer. The wood fiber shall not remain in the slurry longer than two (2) hours. Water used shall be potable water or Class 1 or 2 agricultural irrigation water.

Application rates for wood fiber mulch products that have moisture contents greater than 15 percent shall be increased by the following factor, c:

$$c: = \frac{85 \text{ percent}}{\text{percent fiber (solids) in product}}$$

The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts. The slurry shall be applied uniformly over the site at a rate that is nonerosive and minimizes runoff.

Mulching

Erosion control blankets shall be distributed uniformly over the surface of the seeded area within 48 hours following seeding. The blankets shall be started on the backside three (3) feet below the crest of the treated slope and installed vertically down the treated slope. The netting shall be on top and the fibers in contact with the soil. The edges shall overlap at least four (4) inches onto adjoining blankets.

Anchoring the Mulch

Staples shall be driven vertically into the ground with reference to the slope. Four (4) staples shall be uniformly spaced across the start and end of each roll and placed four (4) inches from the starting edge at the crest of the slope and two (2) inches from the end of each roll.

Staples shall also be uniformly spaced down both sides of each roll at six (6) foot intervals and two (2) inches from the edge. Staples shall also be spaced down the center of each roll at six (6) foot intervals and alternately spaced with respect to the staples on each side.

VI. IRRIGATION

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet.

VII. SPECIAL MEASURES

Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

Other details for the establishment and maintenance of the plants including, but not limited to, the need for livestock and traffic control shall be applied when specified on the Practice Requirements sheet.

Operations shall be done in such a manner that erosion and air and water pollution are minimized and held with legal limits.

The owner, operator, contractor, and other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

342H - CRITICAL AREA PLANTING - CONTAINER PLANTS

I. SCOPE

The work shall consist of furnishing all materials and placing them on areas within the project area or site to the limits as shown on the drawings, or as staked in the field.

II. MATERIALS

Plants

Plants shall be healthy, shapely, and well rooted, with roots showing no evidence of having been damaged, restricted, or deformed. Plants found to be root or pot bound will not be acceptable. Plants shall be vigorous and free of disease, insect pests, eggs or larvae and shall be subject to inspection and approval at the place of growth or upon delivery. Plants shall not be allowed to freeze or dry.

Unless otherwise noted, all plant material shall be grown in nurseries which have been inspected by the State Department of Food and Agriculture and have complied with the regulations thereof. Clearance shall be obtained from the County Agricultural Commissioner, as required by law, before planting plants delivered from outside the county in which they are to be planted.

All specified one-quart and one-gallon plant stock shall be of the standard one-quart and one-gallon size and shall be delivered to the site in one-quart and one-gallon containers or equivalent. All specified five-gallon plant stock shall be of the standard five-gallon size and shall be delivered to the site in five-gallon containers. All specified 15-gallon plant stock shall be of the standard 15-gallon size and shall be delivered to the site in 15-gallon containers.

Manure

Manure shall be well composted, weed free, pulverized, sterilized, and may be furnished in bulk.

Commercial Fertilizer

Commercial fertilizer for trees and shrubs shall be a compressed long lasting slow release tablet form containing a minimum of 20 percent nitrogen, 10 percent available phosphoric acid, and 5 percent water soluble potash with each tablet approximately 21 grams in weight unless otherwise specified on the Practice Requirements sheet.

Commercial fertilizer for flat size plants shall contain a minimum of 10 percent nitrogen, 8 percent available phosphoric acid and 4 percent water soluble potash unless otherwise specified on the Practice Requirements sheet.

All fertilizer shall be delivered in original, unopened factory packaging, shall be free of lumps or other moisture damage, and shall be labeled in accordance with applicable state regulations and bear the warranty of the producer for the grade furnished.

Sand

Sand shall be clean, sharp, silica sand, uniform in size and irregular in shape.

Stakes

Stakes shall be straight and sound heart grade redwood, and shall be two inches by two inches and length as shown on the plans.

Flexible Rods

Flexible rods shall be 1/4-inch diameter steel for five-gallon plants and 3/8-inch diameter for 15-gallon plants and length as shown in plans.

Ties

Ties shall be heavy-duty vinyl, minimum .010 inches thick, or approved flexible rubberized cloth webbing, 1-inch width.

Steel Straps

Straps shall be 1/16-inch by 1-inch mild steel nailed to stakes with 8d box nails.

Mulch

Mulch shall consist of medium ground redwood, fir, cedar, or pine bark chips, 3/8-inch to 1-1/4 inch in size.

III. PLANT MATERIALS AND PLANTING DATE

The plant varieties shown on the drawings and specified on the Practice Requirements sheet shall be used.

Planting shall be performed after final grading is completed and during the period specified on the Practice Requirements sheet.

IV. SITE PREPARATION

All planting areas shall be cultivated and raked to remove any and all weeds or weed clumps and stones or other foreign material exceeding 2-inch diameter to a depth of 8 inches. No planting will be allowed in soil that, in the opinion of the NRCS technician is too wet, too dry, or otherwise improperly conditioned.

Plants shall be the varieties and arranged as shown on the plans. The locations of plants shall be marked for approval by the NRCS technician prior to excavating the plant holes. The locations shall be marked by flags or other approved means. Two days notice shall be given prior to the date desired for inspection by the NRCS technician.

Holes for trees and shrubs shall be excavated to minimum diameters and depths as follows:

Container Size	Hole Diameter	Hole Depth
One quart	12"	12"
One gallon	12"	12"
Five gallon	20"	20"
Fifteen gallon	32"	24"

The sides of the hole shall be vertical, lightly scarified and the bottom of the hole shall be loosened to a minimum additional depth of six inches.

V. PLANTING, FERTILIZING, MULCHING

Planting Trees and Shrubs

Partially backfill planting hole with planting mixture consisting of 50 percent native soil, 25 percent sand, and 25 percent manure by volume, unless otherwise specified on the Practice Requirements sheet, that has been uniformly mixed and is free of clods or lumps and blend planting mix into top two inches of soil in bottom of hole.

Plants shall be removed from the containers in such a manner that the ball of earth surrounding the roots is not broken, except for root bound plants that need their roots pruned, and shall be planted immediately. Cans shall be cut on at least two sides.

Set plants in center of pits, adjusting so that after settlement the crown of the plant will stand one or two inches above finish grade as shown on the plans.

Backfill with planting mixture to one-half root ball height, place one fertilizer tablet per foot of plant height two inches out from root ball and water thoroughly. Backfill rest of hole with planting mixture. Firm down, eliminating all air pockets, do not pack. Build a four-inch high berm around edge of root ball to form a basin for holding water. The bottom of the basin shall be at surrounding finish grade.

Fill basin with water immediately after planting, being careful not to break down the berm, gouge out holes in the backfill, or expose plant roots with hose stream. Settled plants shall be reset to proper grade position and planting basin restored.

No more plants shall be distributed or cans cut than can be planted and watered on that day.

Planting - Flat Size Plants

The 10-8-4 fertilizer shall be distributed uniformly over the areas to be planted to flat size plants at the rate of 20 pounds per 1000 square feet. Fertilizer may be applied in any way that will result in uniform distribution. The fertilizer shall be incorporated into the soil prior to planting. If fertilizing is performed as part of Section IV, Site Preparation, it shall not be accomplished more than (15) days prior to planting.

Prior to planting flat size plants, the areas shall also be watered thoroughly to insure optimum soil moisture to a minimum depth of 8 inches.

Flat size plants shall be planted at spacing specified on plans. Cultivate immediately after completion of planting and water lightly, but thoroughly, taking care to avoid erosion.

Planting -Tree Seedlings

Planting holes shall be made using the Western planting tool, mattock, or other suitable tool. The hole shall have one flat vertical side and be deeper than the plant container.

A single plant shall be immediately placed against the flat vertical side of the hole with roots straight and vertical and the hole carefully backfilled with excavated soil without damaging the roots. Plants in biodegradable containers shall be planted in their container. Plants in nonbiodegradable containers shall be removed from their container at time of planting. The soil around the plant shall be firmed by tamping to eliminate all air pockets, without packing the soil, and the ground line on the plant shall correspond to the adjacent ground line.

A 1.5 foot radius around each plant shall be cleared of any living grasses, legumes, and forbs.

Planting operations shall not create an excessive amount of downward movement of soil or clods on sloping areas and shall not damage newly placed plants, existing trees or tree seedlings. All plants that show damage or improper planting as determined by the NRCS Technician shall be replaced.

Mulching

Mulch shall be applied around each tree and shrub covering the bottom of the basin to a depth of two inches.

Pruning

Plants shall not be pruned prior to planting and after planting only at the direction of the NRCS Technician.

Staking

All 5-gallon and 15-gallon size trees installed shall be supported by three stakes plus ties as shown on the drawings within 48 hours after planting. Spindly trees shall also be supported by a flexible rod plus ties and the three stakes shall be held by a steel strap as shown on the plans. The type of support used for each tree shall be subject to the approval of the NRCS Technician.

VI. IRRIGATION

All trees, shrubs, and flat size plants shall be watered immediately after planting and thereafter as necessary to keep the soil reasonably moist throughout the root system during the first and second growing seasons unless otherwise specified on the Practice Requirements sheet.

Water shall be intermittently applied in a moderate stream that does not displace the mulch or soil around the plant until the surrounding soil is thoroughly saturated. Damage, erosion or slippage of the soil caused by watering shall be repaired by the Contractor at his expense

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet.

VII. SPECIAL MEASURES

Measures and methods that enhance fish and wildlife values, protect visual resources, and maintain key shade, food, and den trees shall be performed when specified on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

For the first two growing seasons all plants and planting areas shall be maintained weed and pest free and shall be protected against animal depredation and other hazards that will adversely affect the plants. All plants that show damage or indicate failure to grow will be replaced. Papers, trash, debris, and surplus earth which accumulate in the planted areas shall be removed and disposed of away from the site and the planted areas shall be cared for as to present a neat and clean condition at all times. Basins, basin walls and other earth areas shall be kept well formed or graded.

Weeding shall be by hand or with a herbicide. When pulled by hand they shall be pulled before they exceed four inches in height or with a herbicide before they exceed two inches in height, unless otherwise specified on the Practice Requirements sheet. When any insecticide or herbicide is used, all manufacturer's label directions and Sate and Federal regulations shall be followed.

No herbicide may be used within 30 days of planting and shall be applied with a photosensitive dye, unless otherwise specified on the Practice Requirements sheet, which will produce a color when sprayed upon the ground. The color shall disappear within two or three

days after being applied and shall not stain concrete, nor be injurious to plant or animal life when applied at the manufacturers recommended application rate.

Other details for the establishment and maintenance of the plants including, but not limited to rodent protection and livestock and traffic control shall be applied when specified on the Practice Requirements sheet.

Operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. All work and operations shall be conducted in accordance with proper safety codes for the type of equipment and operations being performed with due regards to the safety of all persons and property.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

FILTER STRIP

(acre)
CODE 393

DEFINITION

A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater.

Scope

This standard establishes the minimally acceptable requirements for design and operation and maintenance of filter strips for removing sediment, organic matter, and other pollutants from runoff or wastewater.

PURPOSES

To remove sediment and other pollutants from runoff or waste water by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization, thereby reducing pollution and protecting the environment.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies: (1) on cropland at the lower edge of fields or above conservation practices such as terraces or diversions, or on fields adjacent to streams, ponds, and lakes; (2) in areas requiring filter strips as part of a waste management system to treat polluted runoff or waste water; and (3) on forest land where filter strips are needed as part of a forestry operation to reduce delivery of sediment into waterways.

CRITERIA

Filter strips for sediment and related pollutants

These criteria apply to filter strips on cropland at the lower edge of fields, on fields, on pastures, or in manure spreading areas adjacent to streams, ponds, and lakes, and above conservation practices such as terrace or diversions.

The length of flow through vigorous vegetation shall be at least 10 ft for slopes of less than one percent and proportionately up to at least 25 ft for 30 percent slopes.

Filter strips for runoff from concentrated livestock areas

These criteria apply to filter strips for feedlot and backyard runoff.

A settling basin, vegetated barriers, or low velocity channel shall be provided between the waste source and filter strip when more than 100 1,000-pound animal units are confined. Such facilities should be considered for use with all filter strips.

A constructed settling basin, if needed, shall have sufficient capacity, as a minimum, to store the runoff computed for 15 minutes duration at the peak inflow rate resulting from 2-year, 24-hour rainfall. Any basin outflow shall be disregarded in computing minimum storage. Additional storage capacity, based on frequency of cleaning, shall be provided for manure and other solids settled within the basin. When the basin if cleaned after every significant runoff event, additional storage equivalent to at least 0.5 in. from the concentrated waste area shall be provided. If only annual cleaning of the basin is planned, additional storage equivalent to at least 6 in. from the concentrated waste area shall be provided.

A low velocity channel shall be minimum of 75 ft long. It shall be designed for a flow depth of 0.5 ft or less to pass the peak flow resulting from a 2-year, 24-hour rainfall at a velocity of 0.5 ft per second or less. Provisions shall be provided for removing settled solids from the channel as necessary to maintain proper functioning.

A filter strip may be a relatively uniform grass area or grass waterway. Minimum dimensions shall be based on the peak outflow from the concentrated waste area or settling facility based on a 2-year, 24-hour rainfall.

Grass area filter strips shall be generally on the contour and sufficiently wide to pass the peak flow at a depth of 0.5 in. or less. Flow length shall be sufficient to provide at least 15 minutes of flow-through time.

Grass channel filter strips shall be designed to carry the peak flow at a depth of 0.5 ft or less. Flow length shall be sufficient to provide at least 30 minutes of flow thorough time. Grass species and shape of channel shall be such that grass stems will be remain upright during design flow.

Filter strips for controlled overland flow treatment of liquid wastes

These criteria apply to filter strips for wastewater from milk parlors, milking centers, waste treatment lagoon, food processing plants, and animal waste storage facilities. Overland flow filter strips shall be installed on natural or constructed sloped of 2 to 6 percent. They shall have minimum flow lengths of 100 ft on 2 percent slopes and proportionately up to 300 ft on 6 percent slopes. Weekly wastewater application rates should not exceed 6 in. and should be only 1 or 2 in. for highly concentrated wastes. Daily application times should times should not exceed 6 hours, and should be decreased to 2 hours for more concentrated wastes such as that from animal waste storage facilities. Filter strips should be rested at least 2 days each week.

Filter strips on forestland

These criteria apply to filter strips for runoff as part of a forestry operation to reduce delivery of sediment into waterways.

As a guide, the length of flow through undisturbed forest floor should be at least 25 ft for slopes of less than one percent and proportionately up to at least 65 ft for 30 percent slopes and at least 150 ft for 70 percent slopes. Longer flow lengths should be used as contributing drainage areas increase.

CONSIDERATIONS

Evaluate type and quantity of pollutant, slopes and soils, adapted vegetative species, time of year for proper establishment of vegetation, necessity for irrigation, visual aspects, fire hazards, and other special needs. Prevent erosion where filters outlet into streams or channels. If filter strips are to be used in treating wastewater or polluted runoff from concentrated livestock areas, the following must be considered.

1. Adequate soil drainage to ensure satisfactory performance.

2. Provisions for preventing continuous or daily discharge of liquid waste unless the area is adequate for infiltrating all daily applied effluent. Temporary storage should be considered to prevent discharge to the filter strip more frequently than one every 3 days.

3. Enough rest periods to maintain an aerobic soil profile. Storage or alternating filter strips may be desirable.

4. Reduced effectiveness of filter strips under snow or frozen conditions.

5. An adequate filter area and length of flow to provide the desired reduction of pollutants. A serpentine or switchback channel can be used to provide greater length of flow.

6. Provisions for excluding roof water and unpolluted surface runoff.

7. Slopes less than 5 percent are more effective; steeper slopes require a greater area and length of flow.

8. Provisions for mowing and removing vegetation to maintain the effectiveness of the filter area. While not generally recommended, controlled grazing may be satisfactory when the filter area is dry and firm.

9. The need for a level lip weir, gated pipe, sprinklers, or other facilities to distribute flow uniformly across the top of the filter strip and maintain sheet flow through the strip.

Filter strips by themselves will not meet the "non-discharge" requirement applicable to livestock operations requiring permits under the National Pollutant Discharge Elimination System. More stringent pollution abatement measures may also be necessary where receiving waters must be highly protected.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and

recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that during critical periods, such as spawning, eggs in gravel's, and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

1. Filter strips may have only a minor effect on the quantity of surface and ground water.

Water Quality

1. Filter strips for sediment and related pollutants meeting minimum requirements may trap the coarser grained sediment.

2. Filter strips for runoff from concentrated livestock areas may trap organic material, solids, materials that become absorbed to the vegetation or the soil within the filter.

3. Filter strips for controlled overland flow treatment of liquid wastes may effectively filter out pollutants.

4. All types of filters may reduce erosion on the area on which they are constructed.

5. Filter strips trap solids from the runoff flowing in sheet flow through the filter.

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

Development of rills and small channels within filter areas must be minimized. Needed repairs must be made immediately to reestablish sheet flow. A shallow furrow on the contour across the filter can be used to reestablish sheet flow. Vegetation must be maintained in a vigorous condition. If livestock have access to the filter area, it must be fenced to control grazing.

Filter strips may not filter out soluble or suspended fine-grained materials. When a storm causes runoff in excess of the design runoff, the filter may be flooded and may cause large loads of pollutants to be released to the surface water. This type of filter requires high maintenance and has a relatively short service life and is effective only as long as the flow through the filter is shallow sheet flow.

Often they will not filter out soluble materials. This type of filter is often wet and is difficult to maintain.

The filter must be properly managed and maintained, including the proper resting time. Filter strips on forestland may trap coarse sediment, timbering debris, and other deleterious material being transported by runoff.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

STREAM HABITAT IMPROVEMENT AND MANAGEMENT

(Acre)

CODE 395

DEFINITION

Maintain, improve, or restore physical, chemical and biological functions of a stream.

PURPOSES

1. Provide suitable habitat for desired aquatic species and diverse aquatic communities.
2. Provide channel morphology and associated riparian characteristics important to desired aquatic species.
3. Provide aesthetic values and recreation opportunities associated with stream habitats such as angling and fish viewing.

CONDITIONS WHERE PRACTICE APPLIES

Streams where habitat deficiencies limit survival, growth, reproduction, and/or diversity of aquatic species in relation to the potential of the stream.

CRITERIA

General Criteria Applicable to All Purposes

All measures implemented under this practice shall comply with all applicable federal, tribal, state and local laws, rules and regulations. Adjoining riparian corridors will be managed with diverse vegetation suitable for the site conditions and desired ecological benefits such as:

- stream temperature moderation;
- recruitment of instream large wood and fine organic debris;
- input of riparian nutrients and terrestrial insects;
- stream bank stability; and
- flood attenuation.

Consideration should be given to the continued level of instability and erosion potential of the site. When necessary, use of Critical Area Planting (342) standards should be considered when natural establishment of plants is unlikely, or when there is a potential for invasive or noxious weeds.

No action shall have long-term adverse impacts on endangered, threatened, or candidate species or species of concern.

All required permits will be obtained prior to installation of any stream improvement measures.

The California State Department of Fish and Game should be notified before any stream improvement practices are undertaken that alters the streambed as per Section 1600 of the Fish and Game code (http://www.dfg.ca.gov/1600/).

All activities will occur within the respective state's guidelines on timing with regard to breeding and nesting seasons of aquatic and terrestrial organisms.

Structures installed using this standard for any of the purposes will not reduce channel capacity to the extent that excessive bank erosion or unintentional lateral migration of flow is induced.

Where practical, stream habitat and channel forming processes such as natural meandering and floodplain functions will be restored or maintained.

Changes in channel alignment shall be considered only after an evaluation of the effect on the land use, interdependent water disposal systems, hydraulic characteristics, existing structures, and fish and wildlife habitat.

Stream Habitat Management options when implemented should be ecologically integrated.

Instream structure design shall be compatible with the dynamic nature of rivers and recreational and other uses of the stream corridor.

When present, livestock will be managed to prevent streambank erosion, bank trampling, over-grazing, and contamination of the stream from livestock waste. Where riparian grazing is allowed, a grazing management plan shall be prepared as an integral part of the application of this practice.

Refer to practice standard 528A, Prescribed Grazing to address grazing concerns related to

Streambank erosion, water quality and special status species considerations.

Planned stream habitat improvements will:

1. Be based on an assessment of watershed conditions that affect the physical, biological, and chemical conditions of the stream and its riparian area (see References).
2. Be based on an assessment of current stream and riparian conditions. The assessment shall evaluate channel morphology, geomorphic setting, aquatic species, riparian and/or floodplain conditions, and any habitat limitations including restriction of upstream and downstream movement of aquatic species (see References).
3. Emphasize the establishment of an ecologically self-sustaining stream-riparian-system consistent with the watershed conditions and geomorphic setting.
4. Maintain or enhance fish and wildlife species diversity relative to the site's potential. As a part of planning, the aquatic species and life history stage for which the stream is being managed should be evaluated and listed.
5. Maintain or provide fish passage upstream and downstream and allow movement of other aquatic species and stream organic matter to the extent possible (see Practice 396 – FISH PASSAGE).

Additional Criteria Applicable to Purposes 1 and 2

Instream structures will be designed to facilitate establishment and viability of riparian plants. Native riparian-wetland species adapted to local conditions should be used where appropriate and feasible.

Structural stream improvement measures applied will be compatible with the stream's geomorphology. Bioengineering techniques should be considered to protect the banks and re-establish riparian-wetland vegetation

The stream channel being managed under this practice should:

1. Be hydrologically connected to its floodplain and associated wetlands where physically possible and geomorphically appropriate.
2. Reflect sediment transport processes characteristic of the designed stable channel.
3. Have well vegetated banks and a healthy riparian root zone based on the site's potential.
4. Have stream bottom substrates suitable for spawning and/or rearing of desired aquatic species.

Incorporation of these stream channel criteria will generally involve restoration of an appropriate channel width-to-depth ratio, suitable riffle-pool complexes, well-vegetated banks, and/or stream length-gradient relationships in a meandering stream consistent with local conditions and stream geomorphology and relative to the site's potential (see References).

Additional Criteria Applicable to Purpose 3

Recreational and other land use activities will be planned and managed to minimize potential negative impacts on stream corridor vegetation and water quality.

CONSIDERATIONS

There are several options that can be used singularly or in combination to improve stream habitat:

1. Through watershed planning, establish soil conservation, nutrient management, and pesticide management practices and other management techniques for non-point sources of pollution.
2. Reduce or manage excessive runoff due to watershed development.
3. Restore or protect riparian and floodplain vegetation and associated riverine wetlands.
4. Maintain suitable flows for aquatic species and channel maintenance.
5. Provide physical habitat components important to aquatic species such as sediment-free spawning gravel, boulders, large wood, resting pools, overhead cover, and stable banks.
6. Eliminate fish migration barriers such as improperly installed culverts (see Practice 396 - FISH PASSAGE).
7. Provide barriers/screens to exclude fish and other aquatic species from water pumps, diversion ditches, or any area where unintentional entrapment could occur (for fish

screens refer to Practice 587 - STRUCTURE FOR WATER CONTROL).

8. Improve floodplain-to-channel connectivity including off-channel habitats.
9. Provide alternative streamside access for recreational use, livestock, and equipment.
10. Restore natural surface water and ground water interactions by managing ground water withdrawals.

Each reach of a stream is unique, and measures implemented for stream habitat improvement and management must be according to a plan adapted to the specific site.

Stream habitat management provisions should be planned in relation to other land uses that may impact stream habitat. Before designing and implementing stream habitat improvements, consider the known or expected problems within the watershed, such as: point and non-point source pollution, land management activities, and other watershed-related concerns. Any stream habitat management project is most effective when applied within the context of overall watershed conditions and with clear objectives for stream management goals.

Instream structures such as flow deflectors may be considered to provide stream stability and/or habitat elements until the channel and adjacent riparian area can function as a habitat of complex stream structure in dynamic equilibrium.

Cultural Resources Considerations

NRCS' objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

- Consider cultural resources when planning. This practice may adversely affect cultural resources and should comply with GM 420, Part 401, during planning, installation and maintenance.

Environmental Considerations

Stream Habitat Management will improve aquatic habitats and subsequently benefit endangered or threatened species or species of concern and other native aquatic species dependent on this environment. There may be short-term negative impacts when instream construction activities occur, i.e. sedimentation and turbidity. Therefore, timing of project activity is extremely important to reduce negative impacts.

Special attention shall be given to maintaining or improving existing habitat for fish and wildlife and avoiding any damages that could occur with project construction.

Endangered species considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Be aware that critical periods, such as spawning, eggs in gravel's (redds), and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example

there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet. These issues will be addressed as part of the 1600 Stream Alteration Permit process required by the California Department of Fish & Game.

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and shall describe the details adequately to apply the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed for all applications. The plan shall provide for periodic inspection and prompt repair should the application of practices cause streambank or streambed instability. All instream structural measures shall be evaluated on an annual basis.

REFERENCES

NEH-653 - Stream Corridor Restoration: Principles, Processes, and Practices. Federal Interagency Stream Restoration Working Group (FISRWG)(15 Federal agencies of the US Government). Stream Corridor Restoration Handbook. October 1998. http://www.usda.gov/stream_restoration/

California Department of Fish and Game, 1979. *Anadromous Fishes of California.* http://www.dfg.ca.gov/nafwb/pubs/anadfish.pdf

California Department of Fish and Game. 1998. *California Salmonid Stream Habitat Restoration Manual, 3rd Edition, Part X Fish Passage Evaluation At Road Crossings* (Part X is in preparation, expected fall 2001). http://www.dfg.ca.gov/nafwb/pubs/manual3.pdf

Internet Resources:

California Department of Fish and Game

http://www.dfg.ca.gov

http://www.dfg.ca.gov/nafwb/index.html

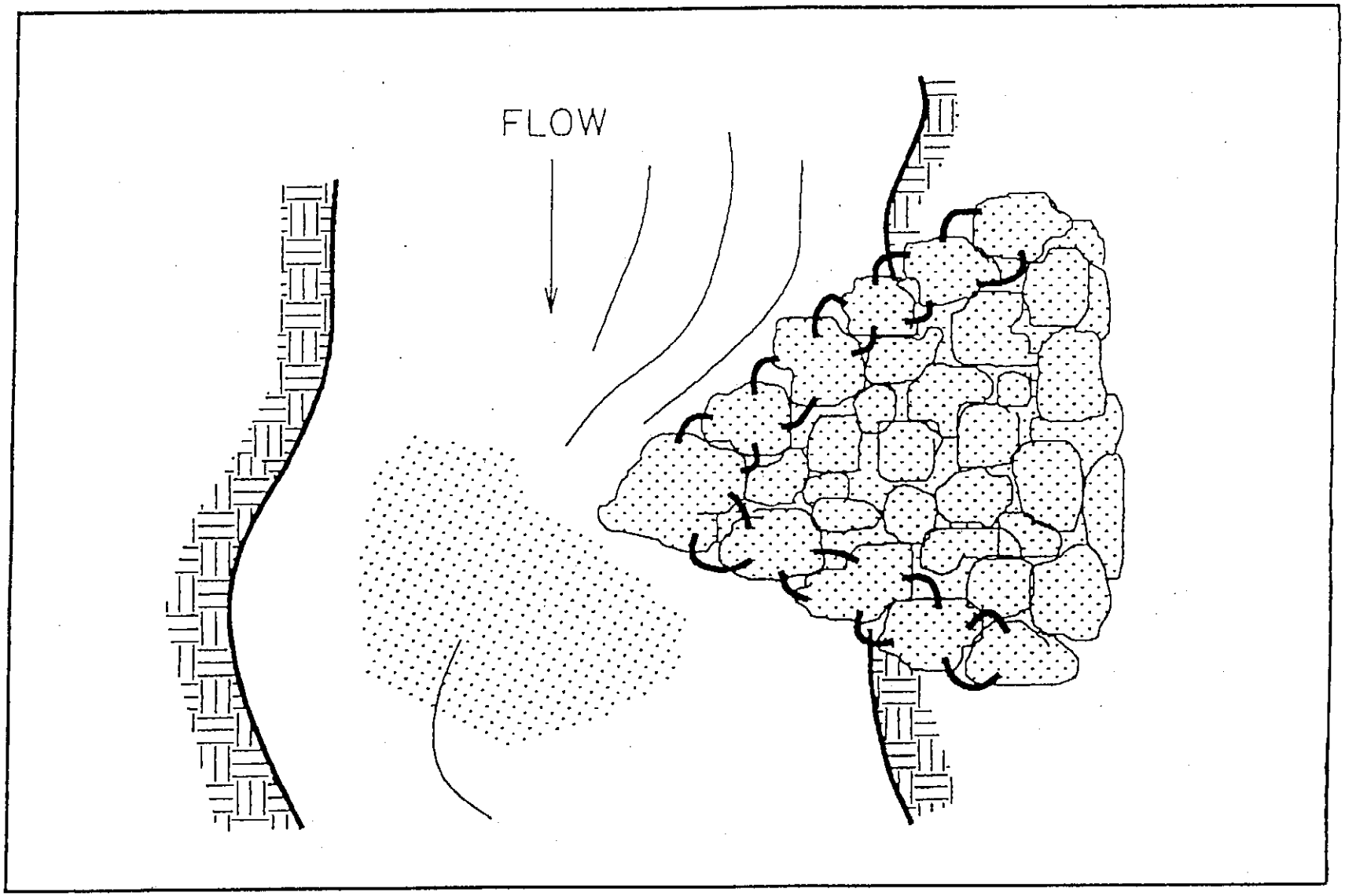
National Marine Fisheries Service Southwest Region

http://swr.nmfs.noaa.gov

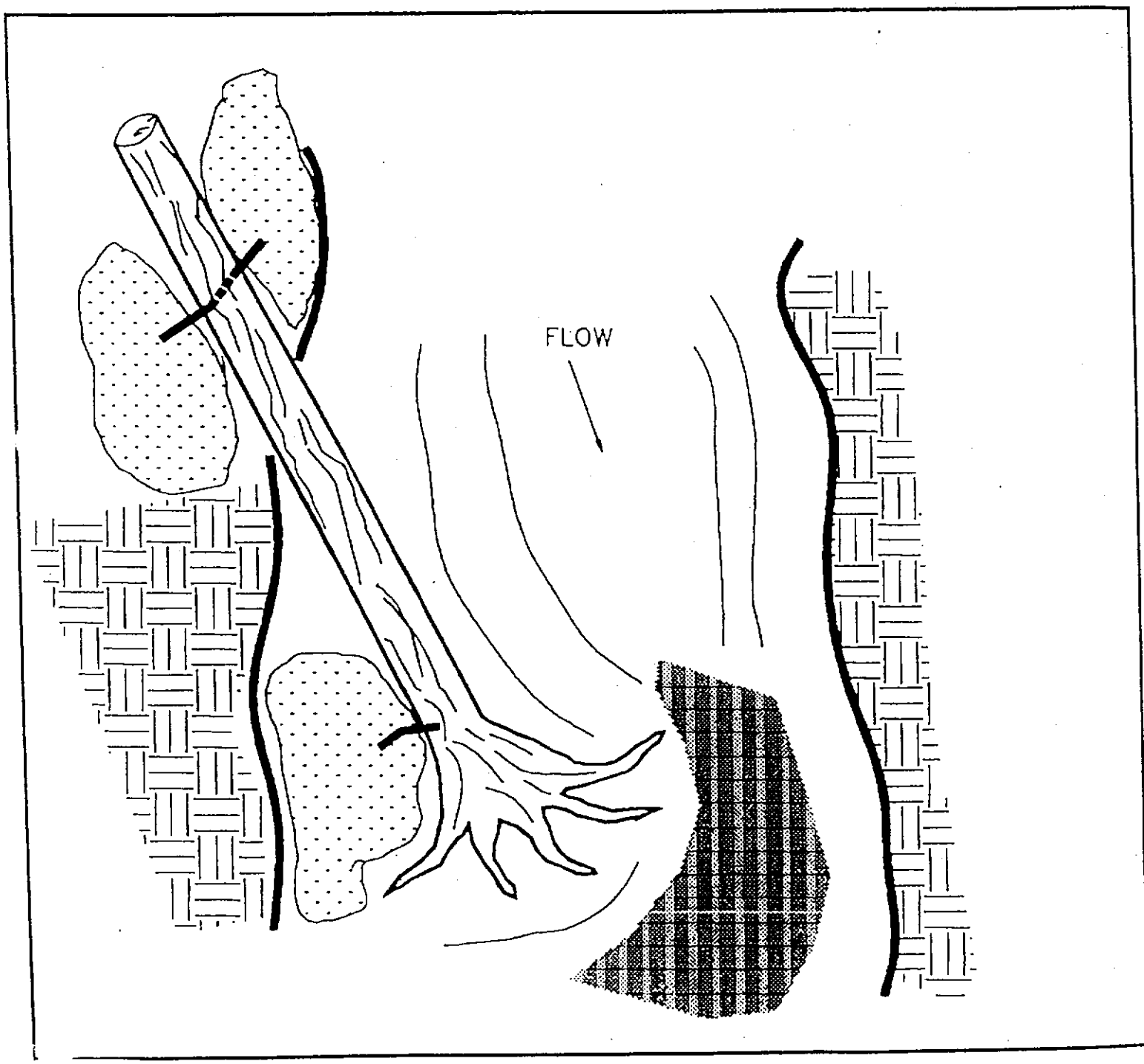
California Department of Fish and Game, June 19, 2000, *Fish Screen Criteria,* http://iep.water.ca.gov/cvffrt/DFGCriteria2.htm

National Marine Fisheries Service, January 1997, *Fish Screening Criteria for Anadromous Salmonids*

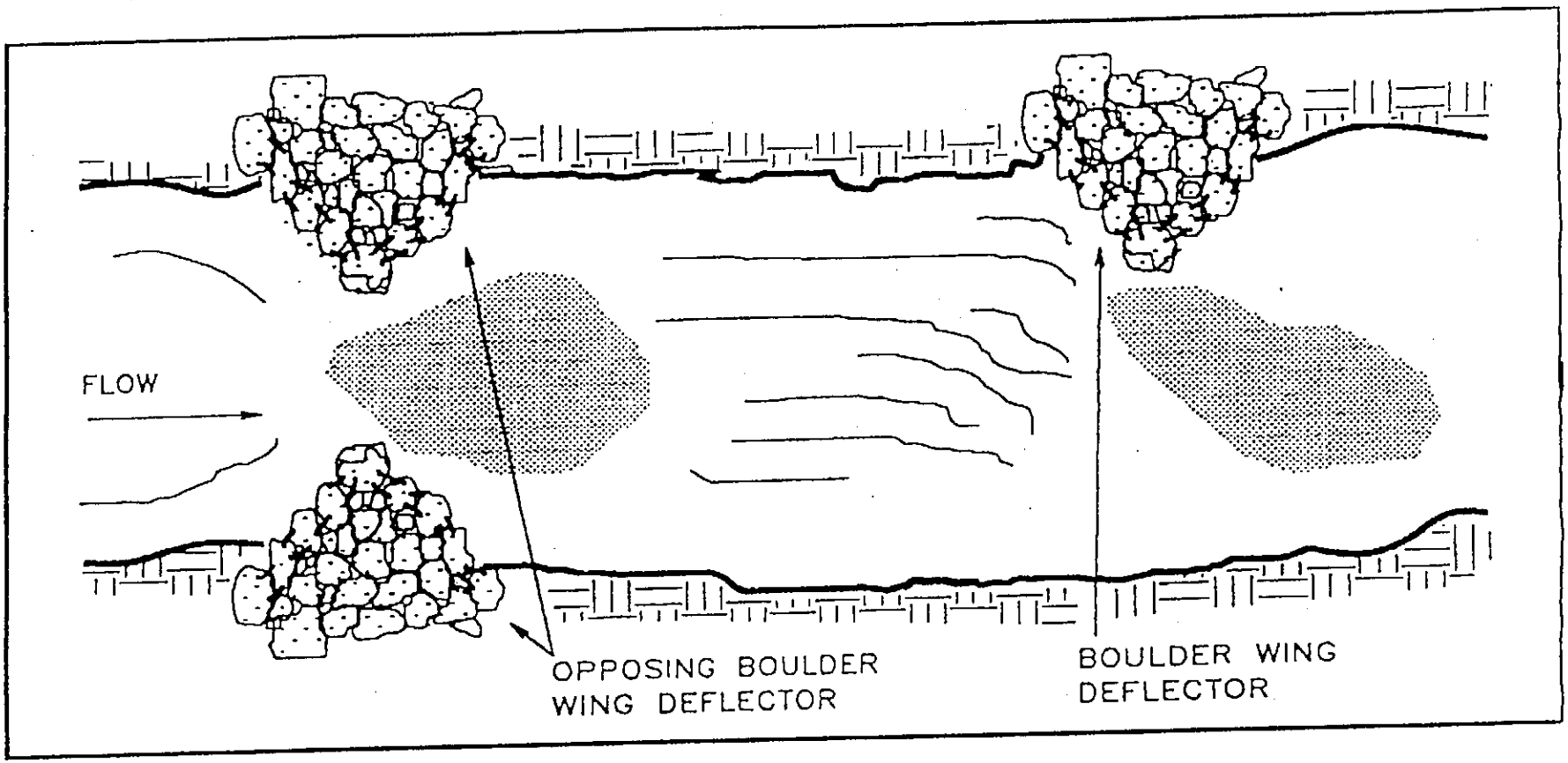
National Marine Fisheries Service, May 9, 1996, *Addendum to Fish Screening Criteria for Pumped Water Intakes.*



Boulder Wing-Deflectors



Digger Logs



Single and Opposing Wing-Deflectors

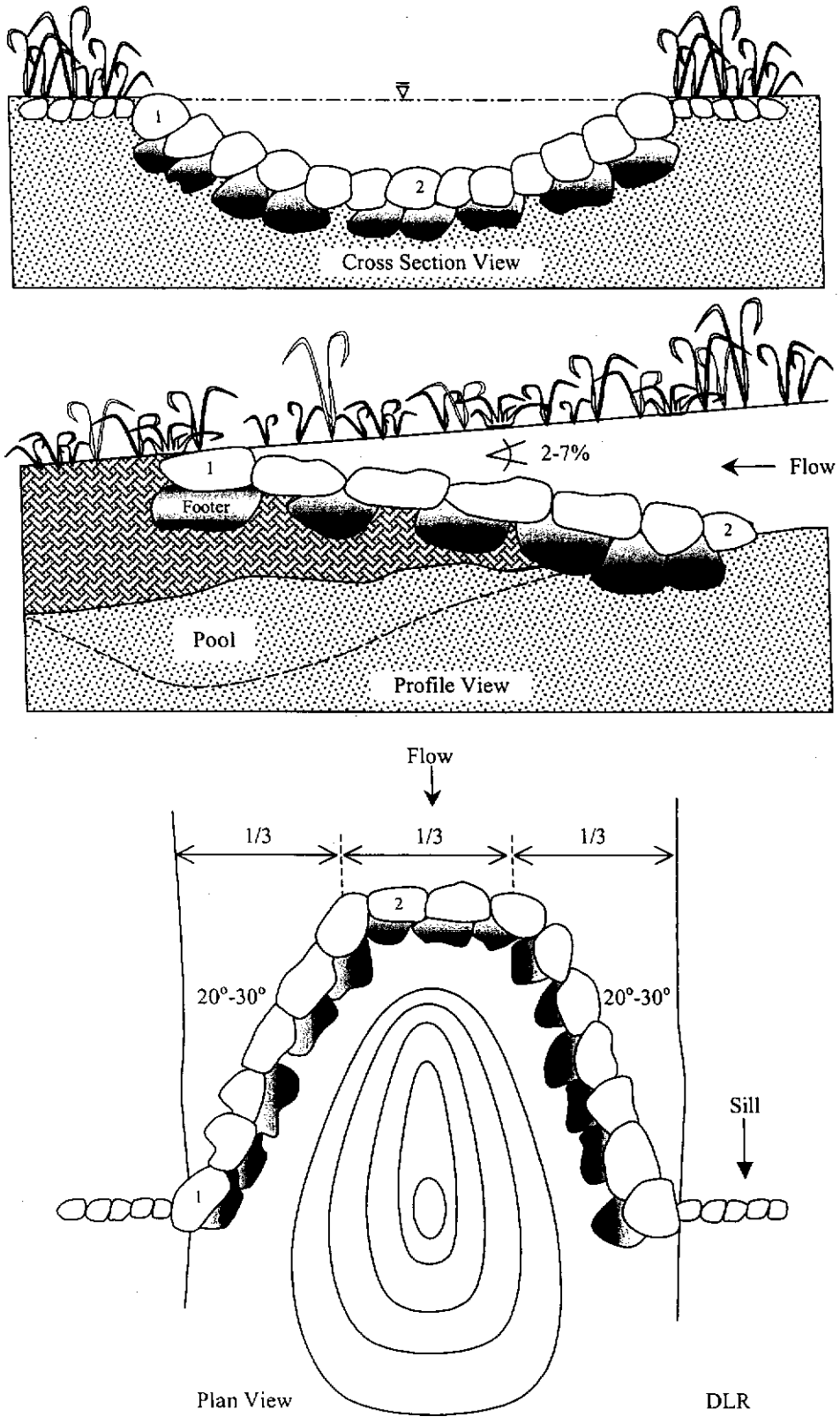


Figure 3. Cross section, profile and plan view of a Cross-Vane

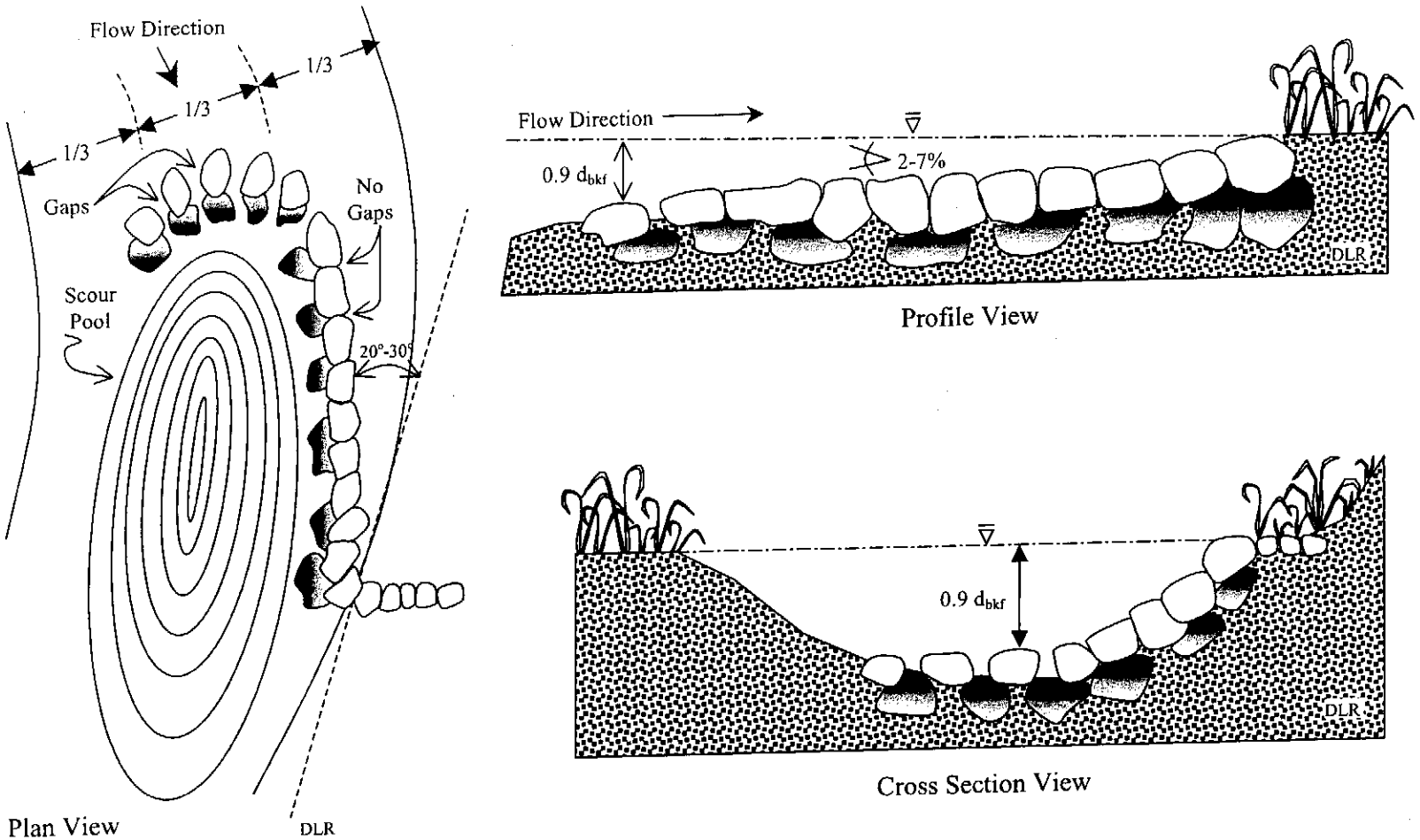


Figure 6. Plan, profile, and section view of the J-Hook Vane

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

GRADE STABILIZATION STRUCTURE

(No.)
CODE 410

DEFINITION

A structure used to control the grade and head cutting in natural or artificial channels.

Scope

This standard applies to all types of grade stabilization structures, including a combination of earth embankments and mechanical spillways and full-flow or detention-type structures. This standard also applies to channel side-inlet structures installed to lower the water from a field elevation, a surface drain, or a waterway to a deeper outlet channel. It does not apply to structures designed to control the rate of flow or to regulate the water level in channels.

PURPOSES

To stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advance of gullies, and to enhance environmental quality and reduce pollution hazards.

CONDITIONS WHERE PRACTICE APPLIES

In areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Special attention shall be given to maintaining or improving habitat for fish and wildlife where applicable.

CRITERIA

The structure must be designed for stability after installation. The crest of the inlet must be set at an elevation that stabilized upstream head cutting.

Embankment dams

Class (a) dams that have product of storage times the effective height of the dam of 3,000 or more, those more than 35 ft in effective height, and all class (b) and class (c) dams shall meet or exceed the requirements specified in Technical Release No. 60 (TR-60).

Class (a) dams that have a product of storage times the effective height of the dam of less than 3,000 and an effective height of 35 ft or less shall meet or exceed the requirements specified for ponds (378).

The effective height of the dam is the difference in elevation, in feet, between the emergency spillway crest and the lowest point in the cross section along the centerline of the dam. If there is no emergency spillway, the top of the dam is the upper limit.

Pond size dams

If mechanical spillways are required, the minimum capacity of the principal spillway shall be that required to pass the peak flow expected from a 24-hour duration design storm of the frequency shown in table 1, less any reduction because of detention storage.

If the effective height of the dam is less than 20 ft and the emergency spillway has a stable grade throughout its length with no overfalls and has good vegetation along its reentry into the downstream channel, the principal spillway capacity may be reduced but can be no less than 80 percent of the 2-year frequency, 24-hour duration storm.

If criteria values exceed those shown in table 1 or the storage capacity is more than 50 acre-ft, the 10-year frequency, 24-hour duration storm must be used as the minimum design storm.

Grade stabilization structures with a settled fill height of less than 15 ft and 10-year frequency, 24-hour storm runoff less than 10 acre-ft, shall be designed to control the 10-year frequency storm without overtopping. The mechanical spillway, regardless of size, may be considered in design and an emergency spillway is not required if the combination of storage and mechanical spillway discharge will handle the design storm. The embankment can be designed to meet the requirements for water and sediment control basins (638) rather than the requirements for ponds (378).

Full-flow open structures

Drop, chute, and box inlet drop spillways shall be designed according to the principles set forth in the Engineering Field Manual for Conservation Practices, the National Engineering Handbook, and other applicable NRCS publications and reports. The minimum capacity shall be that required to pass the peak flow expected from a design storm of the frequency and duration shown in table 2, less any reduction because of detention storage, If site conditions exceed those shown in table 2, the minimum design 24-hour storm frequency is 25 years for the principal spillway and 100 years for the total capacity. Structures must not create unstable conditions upstream or downstream. Provisions must be made to insure reentry of bypassed storm flows.

Toe wall drop structures can be used if the vertical slope is 4 ft or less, flows are intermittent, downstream grades are stable, and tail water depth at design flow is equal to or greater than one-third of the height of the overfall.

The ratio of the capacity of drop boxes to road culverts shall be as required by the responsible road authority or as specified in table 2 or 3, as applicable, less any reduction because of detention storage, whichever is greater. The drop box capacity (attached to a new or existing culvert) must equal or exceed the culvert capacity at design flow.

Island-type structures

If the mechanical spillway is designed as an island-type structure, its minimum capacity shall equal the capacity of the downstream channel. For channels with very small drainage areas, the mechanical spillway should carry at least the 2-year, 24-hour storm or the design drainage curve runoff. The minimum emergency spillway capacity shall be that required to pass the peak flow expected from a design storm of the frequency and duration shown in table 2 for total capacity without overtopping the headwall extensions of the mechanical spillway. Provision must be made for safe reentry of bypassed flow as necessary.

Side-inlet drainage structures

The design criteria for minimum capacity of open-weir or pipe structures used to lower surface water from field elevations or lateral channels into deeper open channels are shown in table 3. The minimum principal spillway capacity shall equal the design drainage curve runoff for all conditions. If site condition values exceed those shown in table 3, the 50-year frequency storm shall be used for minimum design of total capacity.

Landscape resources

In highly visible public areas and those associated with recreation, careful considerations should be given to landscape resources. Landforms, structural materials, water elements, and plant materials should visually and functionally complement their surroundings. Excavated material and cut slopes should be shaped to blend with the natural topography. Shorelines can be shaped and islands created to add visual interest and valuable wildlife habitat. Exposed concrete surfaces may be formed to add texture or finished to reduce reflection and to alter color contrast. Site selection can be used to reduce adverse impacts or create desirable focal points.

General criteria

Earth embankment and emergency spillways of structures for which criteria are not provided under the standard for ponds (378) or in TR-60 must be stable for all anticipated conditions. If earth spillways are used, they must be designed to handle the total capacity flow indicated in tables 2 or 3 without overtopping the dam. The foundation preparation, compaction, top width, and side slopes must ensure a stable dam for anticipated flow conditions. Discharge from the structure shall be sufficient that no crop damage results from flow detention.

Necessary sediment storage capacity must equal the expected life of the structure, unless a provison is made for periodic cleanout.

Necessary sediment storage capacity must equal the expected life of the structure, unless a provision is made for periodic cleanout.

The earth embankment pond structures are potentially hazardous and precautions must be taken to prevent serious injury or loss of life. Protective guardrails, warning signs, fences, or lifesaving equipment shall be added as needed.

If the area is used for livestock, the structures, earthfill, vegetated spillways, and other areas should be fenced as necessary to protect the structure. Near urban areas, fencing may be necessary to control access and exclude traffic that may damage the structure or to prevent serious injury or death to trespassers.

Protection

The exposed surfaces of the embankment, earth spillway, borrow area, and other areas disturbed during construction shall be seeded or sodded as necessary to prevent erosion. If climatic conditions preclude the use of vegetation, non-vegetative covering such as gravel or other mulches may be used.

ROCK DROPS

Site Conditions

Rock drops shall apply to channels with grades less than five percent and width less than 50 feet, or with grades less than eight percent and width less than 25 feet. Flows shall not exceed 3 ft. over the drop for a 50-year frequency storm.

These structures are limited to a maximum drop (F_T) of 4 feet measured from weir to downstream toe; except structures in series, the structures are limited to a drop (F_T) of 4 feet measured from weir to weir.

Design Criteria

Design considerations shall be given to the following points:

(a) Grade of channel
(b) Stability of downstream channel
(c) Rock size and gradation (percent passing)
(d) Existing channel cross-section
(e) Soil material of banks
(f) Filter requirements to prevent piping
(g) Height of drops
(h) Flow depth over drop
(i) Vegetation to be re-established.

Loose rock drops shall be designed according to the principles set forth in National Engineering Handbook, Section 5, Hydraulics, and Figure 2 attached.

Filter blankets will be provided by placement of Geotextile fabric on all interfaces of earth and rock riprap.

The rock size shall be determined by using the empirical relationship shown by the curve in **Figure 2**. D_{75} (percent passing) size rock placed in a row along the downstream crest provides greater stability. Rock should be fairly well graded with no more than 10 percent smaller than 3 inches in size. The total thickness of the rock riprap in the completed structure shall be D_{100} (T). All rock shall be angular or subangular. Subrounded and rounded rock is not permitted.

Structures

Add the following for rock drop structures:

Rock checks may be constructed to control the grade of small channels (or gullies) to prevent further degradation.

a. Flow Design: the design flow shall be the smaller of either the 5-year flow or the full bank capacity flow.

b. Capacity: the drops are to be constructed of loose rocks with sufficient capacity over the weir to pass the design flow.

c. Location: Starting at a given stream channel control point, checks or drops are to be positioned to provide grade control. The structures are to be placed along the channel to provide no more than a 4-foot drop, F_T, from the weir to the downstream toe.

For structures in series the drop will be measured weir to weir, (F_T). The upstream slope of the structure shall be no steeper than 2:1. The top width shall be three feet or greater. The downstream slope shall be no steeper then 6:1 for drops to 3 feet. For drops over 3 feet the downstream slope shall be no steeper than 8:1. The length of the apron (A) of the drop shall be a minimum of $2F_T$. The larger rocks shall be placed in the weir section of the drop. The downstream slope and the apron shall be the same width as the weir.

CONSIDERATIONS

Water Quantity

1. Effects on volumes and rates of runoff, evaporation, deep percolation and ground water recharge.

2. Effects of the structure on soil water and resulting changes in plant growth and transpiration.

Water Quality

1. Ability of structure to trap sediment and sediment-attached substances carried by runoff.

2. Effect of structure on the susceptibility of downstream stream banks and stream beds to erosion.

3. Effects of the proposed structure on the movement of dissolved substances to ground water.

4. Effects on visual quality of water resources.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

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PLANS AND SPECIFICATIONS

Plans and specifications for installing grade stabilization structures shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Tables 1, 2, and 3 available upon request.

OPERATION AND MAINTENANCE

An operation and maintenance plan must be prepared by the Designer for use by the owner or other responsible for operating this practice. The plan should provide specific instructions for operating and maintaining the system to insure that it functions properly. It should also provide for periodic inspections and prompt repair or replacement of damage components.

Table 1. - Design criteria for establishing minimum capacity of the principal spillway for dams with storage capacity of less than 50 acre-feet.

Maximum drainage area for indicated rainfall*			Effective height of dam	Freq. of minimum design, 24-hr duration storm
0-3 in	3-5 in	5+ in		
	acres		ft	yr
200	100	50	35 or less	2
400	200	100	20 or less	2
400	200	100	20-30	5
600	400	200	20 or less	5

*In a 5-year frequency, 24-hour duration storm

NRCS, CA
July, 2000

Table 2 - Design criteria for establishing minimum capacity of full-flow open structures.

Maximum drainage area for indicated rainfall*			Vertical drop	Freq. of minimum design, 24-hour duration storm: Principal Spillway capacity	Total capacity
0-3 in	3-5 in	5+ in			
acres			ft	yr	yr
1,200	450	250	5 or less	5	10
2,200	900	500	10 or less	10	25

*In a 5-year frequency, 24-hour duration storm

Table 3 - Design criteria for establishing minimum capacity of side-inlet, open-weir, or pipe-drop-drainage structure.

Maximum drainage area for indicated rainfall			Vertical drop	Freq. of minimum design, 24-hour duration storm: Receiving channel capacity	Total capacity
0-4 in	3-5 in	5+ in			
acres			ft	ft	yr
1,200	450	250	0-5	0-10	--
1,200	450	250	5-10	10-20	10
2,200	900	500	0-10	0-20	25

*In a 5-year frequency, 24-hour storm.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

410 - GRADE STABILIZATION STRUCTURE

I. SCOPE

The work shall consist of furnishing material for and the construction of grade stabilization structures to the dimensions, lines and grades as shown on the drawings or as staked In the field.

II. SITE PREPARATION

The foundation area shall be cleared of all trees, stumps, roots, brush, boulders, sod, debris and other objectionable material. All top soil shall be removed and stockpiled until needed for spreading over areas requiring vegetative cover. Removal shall be done In such a manner as to avoid damage to other trees and property.

III. EXCAVATION AND SHAPING

Excavation shall be to the lines and grades shown on the drawings or as staked in the field. Subgrade shall be firm and free from water.

IV. EARTHFILLS

All earthfill (except structural backfill) shall be placed and compacted to conform with the requirements of Construction Specifications, 703 - Earthfill.

V. CONCRETE WORK (WHEN SPECIFIED)

Concrete work under these specifications shall be constructed to the dimensions, lines and grades as shown on the drawings. The subgrade for concrete shall be prepared as shown on the drawings or as directed by the Engineer.

All concrete work shall conform to the requirements of Construction Specification, 701- Concrete.

VI. CORRUGATED STEEL PIPE (WHEN SPECIFIED)

Corrugated steel pipe shall conform to diameter, gage, and coatings as shown on the drawings. Unless otherwise specified, the Pipe sections shall be Joined with standard coupling bands. The Pipe shall be firmly and uniformly bedded throughout its entire length to the depth, grades and in the manner shown on the drawings.

VII CONCRETE PIPE (WHEN SPECIFIED)

Concrete pipe shall conform to the size and type as shown on the drawings. The type of joint and joint sealings shall also be as shown on the drawings. The pipe shall be firmly and uniformly bedded throughout its entire length to the depth, grades, and in the manner shown on the drawings.

VIII. TIMBER STRUCTURE (WHEN SPECIFIED)

All structural timber shall be sound wood free of decay and shall conform to the kind, grade, sizes, lengths, and be treated as specified on the drawings. All hardware used for permanent Installations shall be galvanized steel. The Installation shall be true and exact to that shown on the drawings. When necessary, the untreated timber portions of the structure should be prepared and painted.

IX. ROCK AND/OR GROUTED ROCK (WHEN SPECIFIED)

The rock shall be hard, durable, and of the gradation as shown on the drawings. The structure shall be constructed to the shape, lines, grades, and dimensions as shown on the drawings. Bedding and filter materials, if required, shall be as specified on the drawings.

All rock riprap or grouted rock work shall be Installed to conform to the requirements of Construction Specification, 707 Rock Riprap or Construction Specification, 708 Grouted Rock Riprap.

X. STRUCTURE BACKFILL

The work shall consist of construction of all earthfill adjacent to structures.

Materials

The fill materials shall be selected by the Engineer unless otherwise shown on the drawings.

Placement

The fill shall be so constructed that the distribution of materials will be as shown on the drawings and free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material. No fill shall be placed upon a frozen surface nor shall snow, Ice or frozen material be incorporated in the fill.

The fill shall be placed in a manner adequate to prevent damage to the structure and allow the structure to gradually and uniformly assume the backfill loads. The fill shall be placed in not more than four-inch layers.

No fill shall be placed before the following minimum time intervals after placement of concrete:

Walls or Slabs	14 days
Conduits, Precast, Cradled	2 days
Conduits, Precast, Bedded	1 day
Anti-seep Collars	3 days

Moisture Content

The soil moisture of the fill material shall be as directed by the Engineer unless otherwise shown on the drawings.

Compaction

The fill materials shall be compacted to a density equal to that of the adjacent materials. Compaction shall be accomplished by hand tampers or other acceptable means excluding heavy equipment. Heavy equipment shall not be operated within two feet of any structure.

The passage of heavy equipment will not be allowed over any type of conduit unless the backfield has been placed above the top surface of the structure to a height equal to half the clear span width of the structure or pipe or two feet, whichever is greater.

XI. VEGETATIVE REQUIREMENTS

Unless otherwise specified, a protective cover of vegetation shall be established on ail disturbed areas. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

XII. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

XIII. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The competed Job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained grade stabilization structure is an asset to your farm. This grade stabilization structure was designed and installed to stabilize an eroding area and to safely convey runoff from the drainage area. The estimated life span of this installation is at least 10 years. The life of the structure can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic maintenance and may also require operational items to maintain satisfactory performance. Here are some recommendations to help you develop a good operation and maintenance program.

Avoid operating farm equipment too close to the structure, because the equipment will transfer weight to the structure that may be In excess of design and cause damage or failure.

Protect vegetated soil covering, because removal will accelerate soil erosion that may result in damage to earthfills or spillways.

Control livestock access to the structure because they may be injured, damage protective vegetation and earthfills or accelerate soil erosion.

Removal of debris that may accumulate at the structure, and immediately upstream or downstream from the structure. Debris accumulation may reduce the hydraulic capacity and cause structural damage or failure during a design storm.

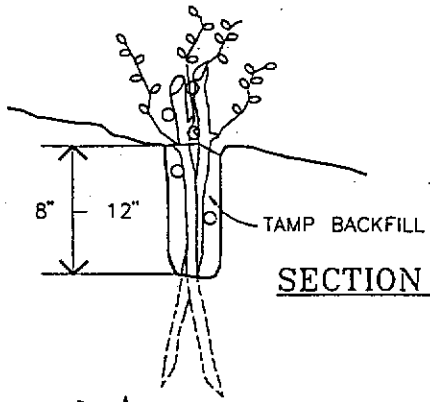
Make sure all structure drains are functional and soil is not being transported through the drainage system. The screens and/or rodent guards shall also be kept in place.

Eradicate or otherwise remove all rodents or burrowing animals because their burrows may weaken earthen sections and develop flow paths for water and accelerate soil erosion or failure.

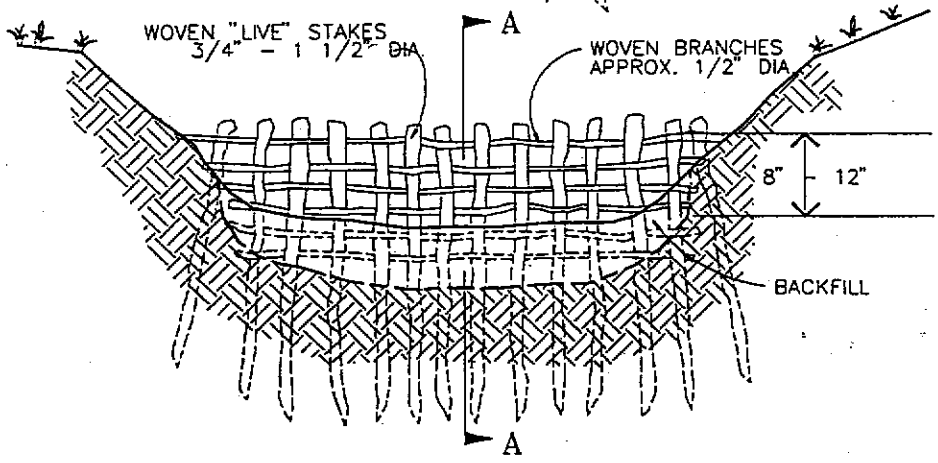
Immediately repair any damage caused by their activity.

Other items specific to your project are listed on the "Practice Requirement" sheet.

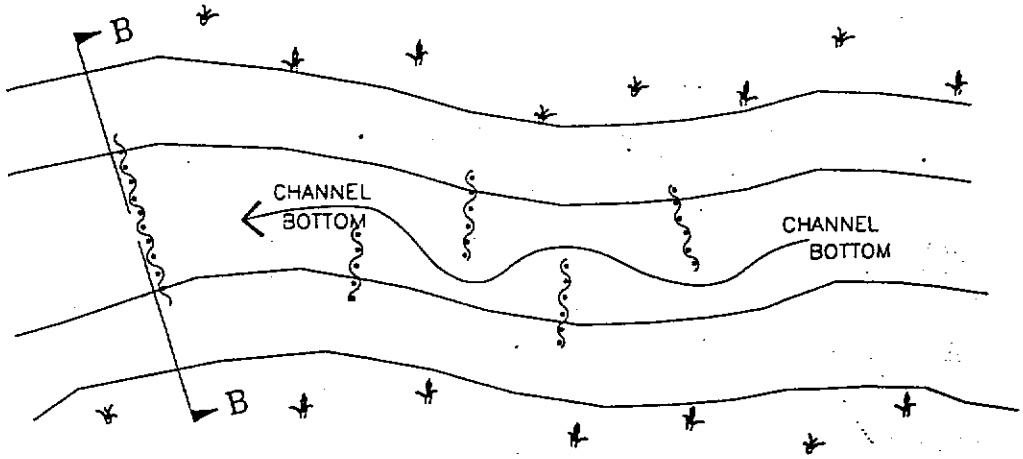
WILLOW CUTTING AND PLANTING SHOULD BE PERFORMED WHEN PLANT MATERIAL IS DORMANT. (NOVEMBER – APRIL)



SECTION A – A



SECTION B – B

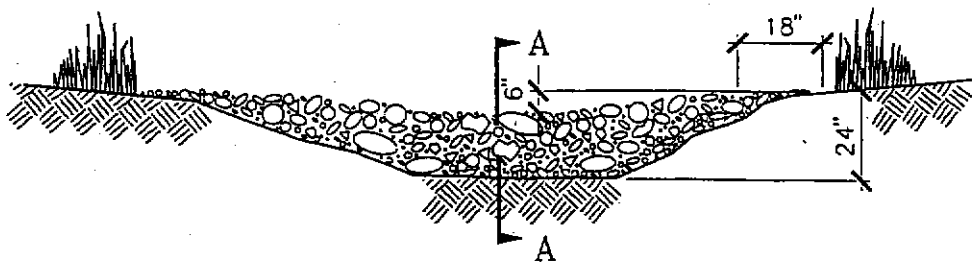


WOVEN WILLOW (LIVE) CHECKDAMS ACT AS VELOCITY DISSIPATORS TO REDUCE GULLY DOWNCUTTING

WILLOW CHECK DAM

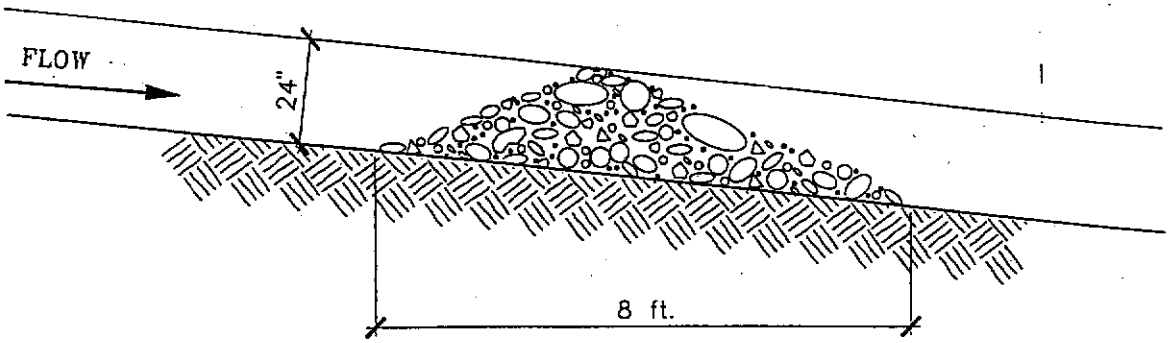
Typical Willow Grade Stabilization Structure

USDA - NRCS



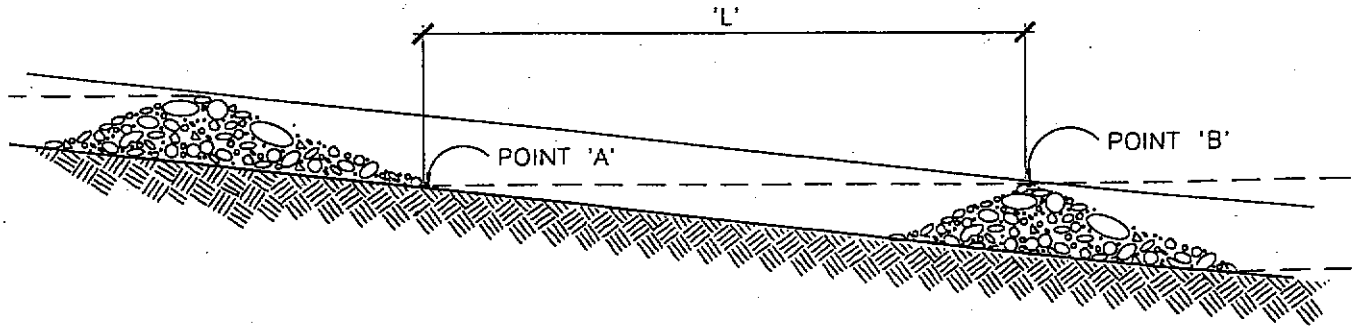
VIEW LOOKING UPSTREAM

NOTE:
KEY STONE INTO THE DITCH BANKS
AND EXTEND IT BEYOND THE ABUTMENTS
A MINIMUM OF 18" TO PREVENT OVER
FLOW AROUND DAM.



SECTION A – A

'L' = THE DISTANCE SUCH THAT POINTS 'A' AND
'B' ARE OF EQUAL ELEVATION.



SPACING BETWEEN CHECK DAMS

ROCK CHECK DAM

Typical Rock Grade Stabilization Structure

USDA - NRCS

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

GRASSED WATERWAY
(Acre)
CODE 412

DEFINITION

A natural or constructed channel that is shaped or graded to required dimensions and established with suitable vegetation.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- to convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding;
- to reduce gully erosion;
- to protect/improve water quality.

CONDITIONS WHERE PRACTICE APPLIES

In areas where added water conveyance capacity and vegetative protection are needed to control erosion resulting from concentrated runoff and where such control can be achieved by using this practice alone or combined with other conservation practices.

CRITERIA

General Criteria Applicable to All Purposes

Grassed waterways shall be planned, designed, and constructed to comply with all Federal, State, and local laws and regulations.

Capacity - The minimum capacity shall be that required to convey the peak runoff expected from a storm of 10-year frequency, 24-hour duration. When the waterway slope is less than 1 percent, out-of-bank flow may be permitted if such flow will not cause excessive erosion. The minimum in such cases shall be the capacity required to remove the water before crops are damaged.

Velocity - Design velocities shall not exceed those obtained by using the procedures, "n" values, and recommendations in the NRCS Engineering Field Handbook (EFH) Part 650, Chapter 7, or Agricultural Research Service (ARS) Agricultural Handbook 667, Stability Design of Grass-lined Open Channels.

The permissible velocity for waterways lined with vegetation of good cover and with proper maintenance shall not exceed 5 ft./sec. For channels with poor cover and little maintenance, the velocity shall not exceed 3 ft./sec.

Width - The bottom width of trapezoidal waterways shall not exceed 100 feet unless multiple or divided waterways or other means are provided to control meandering of low flows.

Side slopes - Side slopes shall not be steeper than a ratio of two horizontal to one vertical. They shall be designed to accommodate the equipment anticipated to be used for maintenance and tillage/harvesting equipment that will cross the waterway.

Depth - The minimum depth of a waterway that receives water from terraces, diversions, or other tributary channels shall be that required to keep the design water surface elevation at, or below the design water surface elevation in the tributary channel, at their junction when both are flowing at design depth.

Freeboard above the designed depth shall be provided when flow must be contained to prevent damage. Freeboard shall be provided above the designed depth when the vegetation has the maximum expected retardance.

Protective Armor - When the grade of the waterway for any reach is sufficiently steep to create velocities greater than 5 ft. per sec., a protective armor of a 3-dimensional nylon filament

mat may be used. In these cases the maximum velocities shall not exceed 10 ft./sec. When velocities exceed 10 ft./sec. for any reach, the waterway for that reach shall be designed in accordance with Practice Standard (468) Lined Waterway or Outlet.

Drainage - Designs for sites having prolonged flows, a high water table, or seepage problems shall include NRCS Practice Standard (606) Subsurface Drains, (620) Underground Outlet, stone center drain or other suitable measures to avoid saturated conditions.

Outlets - All grassed waterways shall have a stable outlet with adequate capacity to prevent ponding or flooding damages. The outlet can be another vegetated channel, an earthen ditch, a grade-stabilization structure, filter strip or other suitable outlet.

Vegetative Establishment - Grassed waterways shall be vegetated according to NRCS Conservation Practice Standard (342) Critical Area Planting.

Seedbed preparation, time of seeding, mixture rate, stabilizing crop, mulching, or mechanical means of stabilizing, fertilizer, and lime requirements shall be specified for each applicable area.

Establish vegetation as soon as conditions permit. Use mulch anchoring, nurse crop, rock, straw or hay bale dikes, filter fences, or runoff diversion to protect the vegetation until it is established.

CONSIDERATIONS

The most critical time in successfully installing grassed waterways is when vegetation is being established. Special protection such as mulch anchoring, straw or hay bale dikes, or other diversion methods are warranted at this critical period. Supplemental irrigation may also be warranted. The vegetation should be well established before large flows ate permitted in the channel.

Important wildlife habitat, such as woody cover or wetlands, should be avoided or protected if possible when siting the grassed waterway. If trees and shrubs are incorporated, they should be retained or planted in the periphery of grassed waterways so they do not interfere with hydraulic functions. Mid- or tall bunch grasses and perennial forbs may also be planted along waterway margins to improve wildlife habitat. Waterways with these wildlife features are more beneficial when connecting other habitat types; e.g., riparian areas, wooded tracts and wetlands.

Water-tolerant vegetation may be an alternative on some wet sites.

Use irrigation in dry regions or supplemental irrigation as necessary to promote germination and vegetation establishment.

Provide livestock and vehicular crossings as necessary to prevent damage to the waterway and its vegetation.

Establish filter strips on each side of the waterway to improve water quality.

Add width of appropriate vegetation to the sides of the waterway for wildlife habitat

Planning

1. The drainage area must be treated adequately against sheet and rill erosion before a grassed waterway is installed to keep sediment from damaging the vegetation and reducing capacity of the grassed waterway.

2. Vegetated waterways perform most dependably in areas where dense stands of sod forming perennial grass can be used that will permit increasing water velocities several feet per second as compared to the bare earth channel. When only shallow rooted annual species can be maintained, safe velocities cannot appreciably exceed those for bare earth. When annual species are the only choice for waterway cover, supporting grade control structures will usually be needed for gully control.

3. Planting should be timed so plants will be established prior to expected runoff. Grassed outlets are easily damaged by continuous flows over long periods. Waterways receiving irrigation tailwater or prolonged trickle flows from snow melt will often require mechanical conveyances of sufficient capacity to contain the low-volume sustained flows.

4. Where irrigation water is available for establishment and maintenance, properly vegetated waterways can often provide esthetically pleasing solutions to erosion control problems for parks, golf courses and other green-belt areas. In such settings the waterways will require protection from

excessive traffic. Turf grasses that will withstand close frequent mowing should ordinarily be used for waterways on non-agricultural land.

5. Waterways require protection from channel flows until the vegetation is fully established and must have continuous protection from damage by vehicular traffic and grazing. Herbicides that would damage the cover must not be used. When temporary berms or dikes are used to keep runoff from entering the waterway during establishment, allow sufficient distance from the waterway edge to accommodate removal without damaging the waterway.

6. Invading pocket gophers can cause excessive damage to waterways if not controlled. Maintenance plans should make provisions for prompt eradication.

7. Waterway shaping must be completed and associated mechanical structures (drops, pipes, permanent sprinkler systems, etc.) installed and inspected for conformance to design before starting vegetative measures.

8. The vegetative species chosen must be compatible with the overall crop management system. This is of special importance when selecting perennial or reseeding type annual species.

9. Annual species used for erosion control should be capable of rapid vigorous establishment and growth. Species should be selected for machine operations minimal and avoid use of equipment when soils are wet.

10. The planting mixture will be in conformance with the Vegetative Guide in Section II-D of the Field Office Technical Guide.

11. When used as a stable outlet for another practice, waterways may increase the likelihood of dissolved and suspended pollutants being transported to surface waters when these pollutants are delivered to the waterway.

Cultural Resources Considerations

NRCS' objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS' objective is to benefit these species and others of concern, or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates that the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

This practice is used either to stabilize an active gully or serves as a stable outlet channel for contouring, contour stripcropping, diversions, terraces, rock barriers, water control structures,

hillside ditches, and underground outlets. Since they are usually installed in areas of concentrated flow, their effect on the quantity of ground and surface water is minor. There may be a slight reduction in the peak discharge from the drainage area.

1. Effects on the components of the water budget, especially on volumes and rates of runoff.

Water Quality

This practice may reduce the erosion in a concentrated flow area, such as in a gully or in ephemeral gullies. This may result in the reduction of sediment and substances delivered to the receiving waters. Vegetation may act as a filter in removing some of the sediment delivered to the waterway, although this is not the primary function of a grassed waterway.

Any chemicals applied to the waterway in the course of treatment of the adjacent cropland may wash directly into the surface waters in the case where there is a runoff event shortly after spraying.

1. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substance carried by runoff.

2. Filtering effects of vegetation on movement of sediment and dissolved and sediment-attached substances.

3. Short-term and construction-related effects on downstream water resources.

PLANS AND SPECIFICATIONS

Plans and specifications for grassed waterways shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s).

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be provided to and reviewed with the landowner. The plan shall include the following items and others as appropriate.

A maintenance program shall be established to maintain waterway capacity, vegetative cover, and outlet stability. Vegetation damaged by machinery, herbicides, or erosion must be repaired promptly.

Seeding shall be protected from concentrated flow and grazing until vegetation is established.

Minimize damage to vegetation by excluding livestock whenever possible, especially during wet periods.

Inspect grassed waterways regularly, especially following heavy rains. Damaged areas will be filled, compacted, and seeded immediately. Remove sediment deposits to maintain capacity of grassed waterway.

Landowners should be advised to avoid areas where forbs have been established when applying herbicides. Avoid using waterways as turn-rows during tillage and cultivation operations. Prescribed burning and mowing may be appropriate to enhance wildlife values, but must be conducted to avoid peak nesting seasons and reduced winter cover.

Mow or periodically graze vegetation to maintain capacity and reduce sediment deposition.

Control noxious weeds.

Do not use as a field road. Avoid crossing with heavy equipment when wet.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

412 - GRASSED WATERWAY

I. SCOPE

The work shall consist of grading and shaping a natural or constructed waterway to the lines and grades as shown on the drawings, including furnishing of seed, fertilizer, and mulch required for planting vegetation within the waterway.

II. MATERIALS

Nylon Mat

The mat shall be of 3-dimensional structures of entangled nylon filament mat heat bonded at the intersections. The mat shall be black in color and be resistant to chemical and environmental degradation. The mat shall be at least 9 mm in thickness.

Staples

The staples shall be U,shaped or T,shaped with legs at least 10 inches in length and have a 2-inch crown or top and shall be made of 11 gauge or heavier wire.

Stakes

Stakes shall be cut from new 1-inch wood and be at least 12 inches in length and be wedge shaped with at least a 2-inch top.

Seed

All seed shall be delivered to the site, tagged and labeled in accordance with California Agricultural Code, and shall be acceptable to the County Agricultural Commissioner.

Seed shall be of a quality which has a minimum pure live seed content of 80 percent (percent purity X percent germination) and weed seed shall not exceed 0.5 percent of the aggregate of pure live seed and other material.

Bag tag figures will be evidence of purity and germination. No seed will be accepted with a date of test of more than 9 months prior to the date of delivery to the site.

Sprigs

Bermuda Grass sprigs will be stolon or rhizome sprigs, 3- to 12-inches long containing 3 or more nodes. Sprigs shall be taken from healthy, vigorous, strong growing plants and when delivered to the site shall be in a live, moist and healthy condition. They shall not be harvested more than 24 hours prior to delivery, and may be held on site if kept cool and moist for a period not longer than 24 hours.

Plugs

Bermudagrass plugs shall be a minimum surface size of 3 inches X 3 inches and shall be not less than 2-1/2 inches thick. Plugs shall come from healthy, vigorous, established sod that has not been previously harvested for at least nine months. The plugs may be cut on-the-site from sod, or prepared at the place of harvest. They shall not be harvested more than 24 hours prior to delivery.

Plugs shall be kept moist and protected from the sun and drying winds, and aerated as necessary to prevent heating until planted. They may be held on site for a period not longer than 24 hours.

Fertilizer

Unless otherwise specified on the "Practice Requirements" sheet, fertilizer shall be Ammonium Phosphate and contain a minimum of 16 percent nitrogen, 20 percent available phosphoric acid and 0 percent water soluble potash, uniform in composition, dry and free flowing, pelleted, or granular.

All bagged fertilizer shall be delivered in unbroken or unopened containers, labeled in accordance with applicable state regulations and bearing the warranty of the producer for the grade furnished.

Inoculants

The inoculant for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the plant species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. For nonpellet inoculated seed, two times the amount of the inoculant recommended by the manufacturer shall be used and seed shall be sown within 24 hours of treatment.

For pellet incoluated seed, the inoculation rate shall be at least 30 pounds per 1,000 pounds of raw seed and the seed shall be labeled to show the Lot Number, Expiration Date of the Rhizobia, and Percent Coat of the finished product.

Pellet inoculated seed shall be sown within 30 days of inoculation, shall be kept cool until sown, and shall achieve at least 80 percent nodulation.

Mulch

Straw mulch shall be new straw derived from rice, wheat, oats, or barley. The contractor, owner, or their representative shall furnish evidence that clearance has been obtained from the County Agricultural Commissioner, as required by law, before sprigs, plugs, and straw obtained from outside the county in which it is to be used is delivered to the site of the work.

III. SITE PREPARATION AND CHANNEL CONSTRUCTION

The foundation area shall be cleared by removing obstructions, trees (if necessary), stumps, roots, brush, boulders, debris, and other objectionable material. Removal shall be done in such manner as to avoid damage to other trees and property.

Any topsoil excavated to shape the channel shall be stockpiled until needed for spreading over areas that will be vegetated.

The channel shall be constructed to the cross-section, lines and grades as shown on the construction drawings. All spoil material shall be placed in areas as staked in the field and shaped to accommodate the vegetation operation. All fill areas within the cross-section of the waterway shall be compacted by a minimum of one passage of the equipment over the entire fill surface area of each lift. The final grading operation shall be made to accommodate seedbed preparation.

IV. SEEDING MIXTURE

The seed(s), sprigs, plugs, and rate(s) specified on the Practice Requirements sheet shall be used.

The seeding rate(s) shall be the weight exclusive of any coating material. Any legume seed used shall be inoculated.

Planting shall be performed after final grading is completed and any protective armor work has been finished unless otherwise specified on the Practice Requirements sheet.

V. SEEDBED PREPARATION

The area to be planted shall be weed free and have a firm seedbed which has previously been roughened by scarifying, disking, harrowing, chiseling, or otherwise worked to a depth of 2 to 4 inches. No implement shall be used that will create an excessive amount of downward movement of clods on sloping areas. Seedbed may be prepared at time of completion of earthmoving work.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance shall be removed. Seedbed preparation shall be suspended when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed.

VI. SEEDING, SPRIGGING OR PLUGGING, FERTILIZING, MULCHING AND ANCHORING THE MULCH

Seeding

Seed shall be drilled or broadcast by hand, mechanical hand seeder, or power operated seeder. Seed shall be incorporated into the soil, but not more than 1 inch deep.

Fertilizing

Fertilizer shall be distributed uniformly over the seedbed at the rate of 500 pounds per acre unless a different amount is specified on the Practice Requirements sheet. Fertilizer shall be applied in any way that will result in uniform distribution. The fertilizer shall be incorporated into the soil. Fertilizing it shall not be accomplished more than 15 days prior to seeding.

Mulching

A mulch covering shall be distributed uniformly over the seeded area within 48 hours following seeding. Straw mulch shall be applied at a rate of 2 tons per acre unless a different amount is specified on the Practice Requirements sheet. The mulch shall be applied by hand, blower, or other suitable equipment. If straw is applied by blower, it shall not be chopped in lengths less than 6 inches.

Anchoring the Mulch

The mulch shall be anchored in place. Anchoring process may include using hand tools, mulching rollers, disks, or similar types of suitable equipment and shall be performed in a satisfactory manner.

Sprigging or Plugging

Bermudagrass sprigs or plugs shall be planted in areas having adequate moisture throughout the summer. The sprigs or plugs shall be planted into moist soil beginning at the waterline and shall be planted in one or more rows as shown on the attached drawing with plants every 12 to 15 inches apart in a row. The adjacent row will be 12 to 15 inches apart and staggered with respect to the bottom row.

Sprigs will be planted in such a manner so that at least two or more nodes of the plant will be buried in the ground.

A planting hole for each plug shall be prepared with an appropriate hand tool. Planting techniques will be such that the soil is adequately firmed around each plug.

VII. IRRIGATION

When specified, irrigation water shall be applied at the times and rates as listed on the Practice Requirements sheet.

VIII. OTHER REQUIREMENTS

Other details for the establishment and maintenance of the plants including, but not limited to, the need for livestock and traffic control shall be applied as listed on the Practice Requirements sheet.

IX. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhances fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

X. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits.

The owner, operator, contractor, and other persons shall conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

XI. OPERATION AND MAINTENANCE

The estimated life span of this installation is at least 10 years. The life of this installation can be assured and usually increased by developing and carrying out a good operation and maintenance program.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Remove all foreign debris that hinders system operation.

Limit the traffic and do not use as a roadway.

Limit livestock usage to vegetative growth periods when they will not damage vegetative root system or compact the soil.

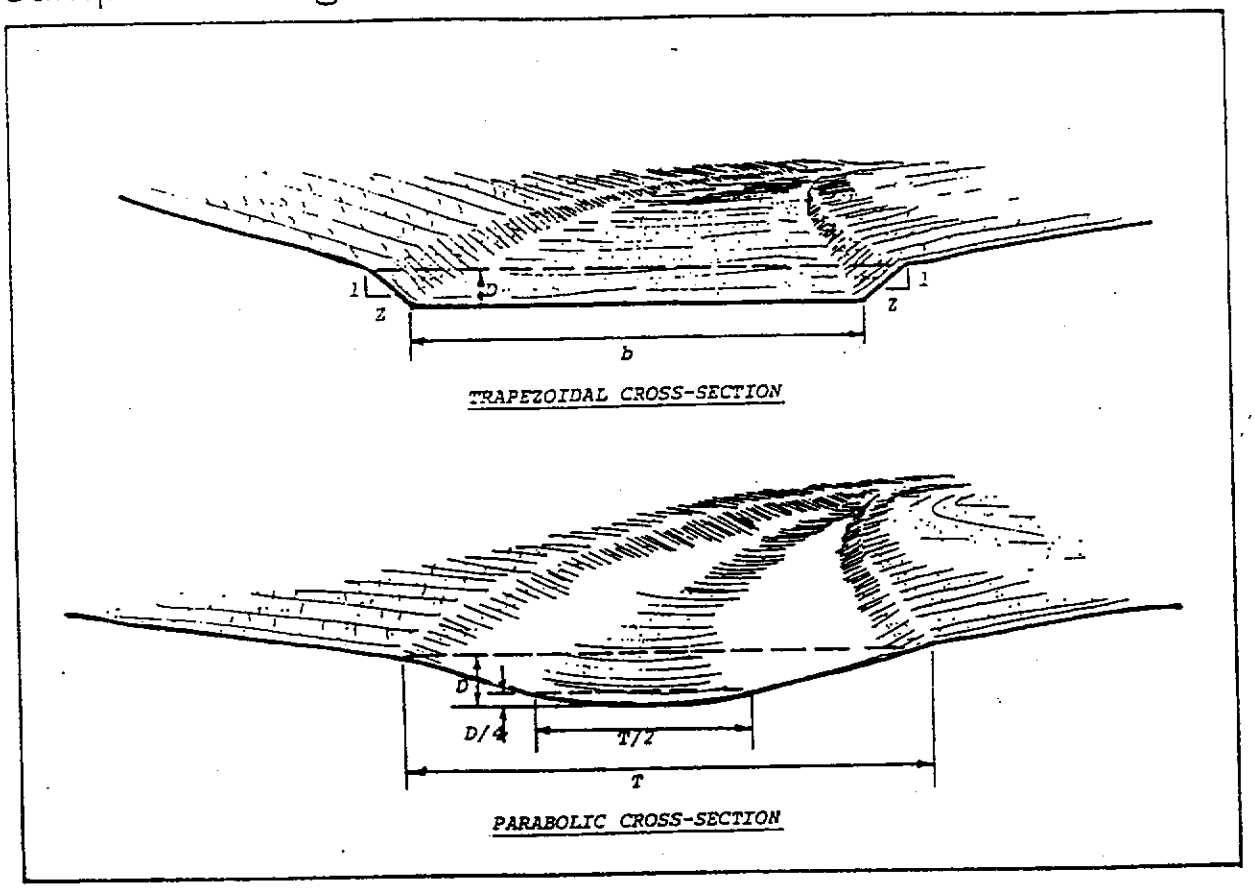
Immediately repair any vandalism, vehicular, or livestock damage.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Check all rock riprap sections for accelerated weathering and displacement. Replace to original grades if necessary.

Other items specific to this project are listed on the "Practice Requirement" sheet.

Sample Drawing: Grassed Waterway

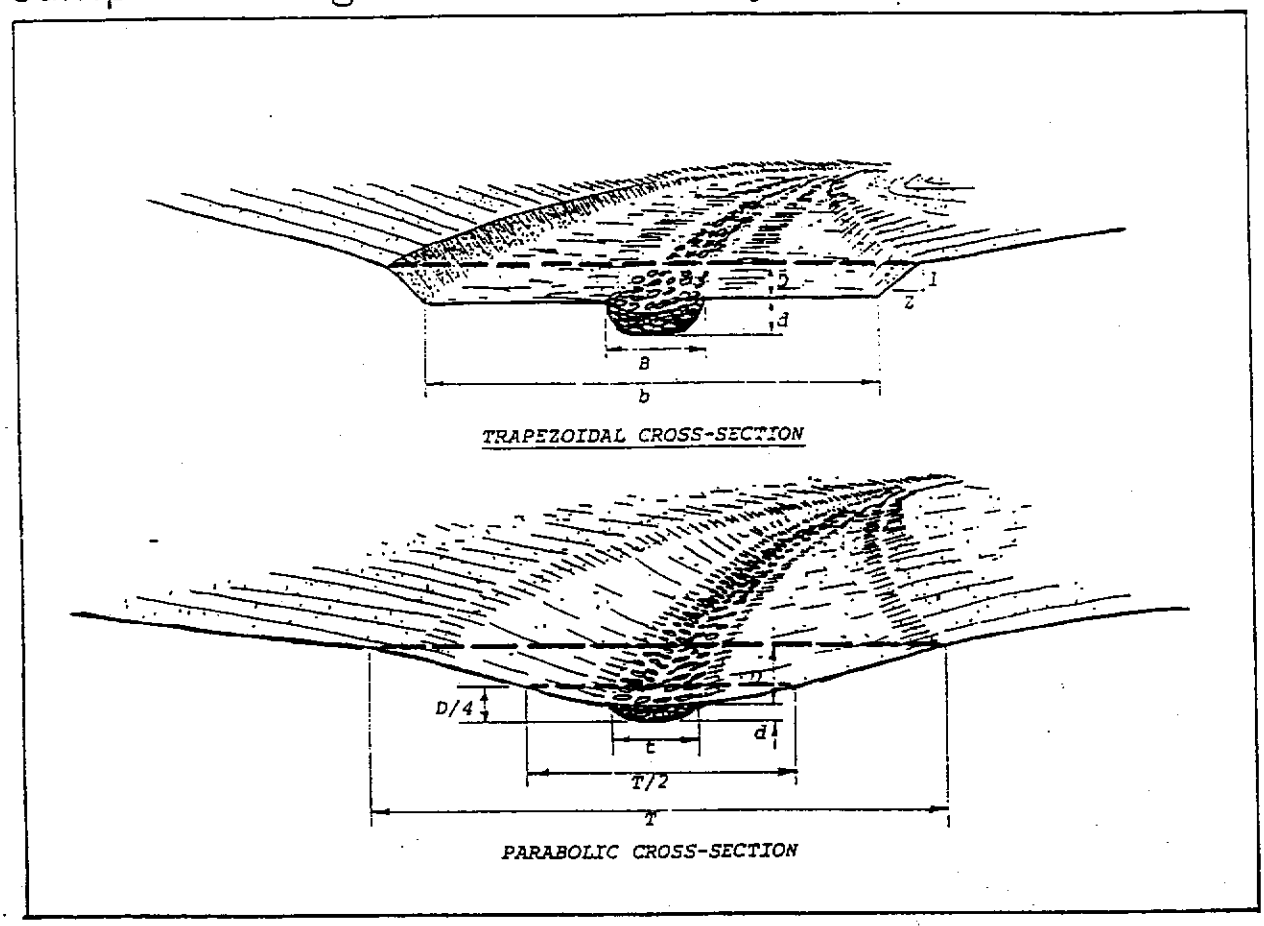


(adapted from USDA, Soil Conservation Service, College Park, Maryland. Standards and Specifications for Soil Erosion and Sediment Control in Developing Areas. July 1975.)

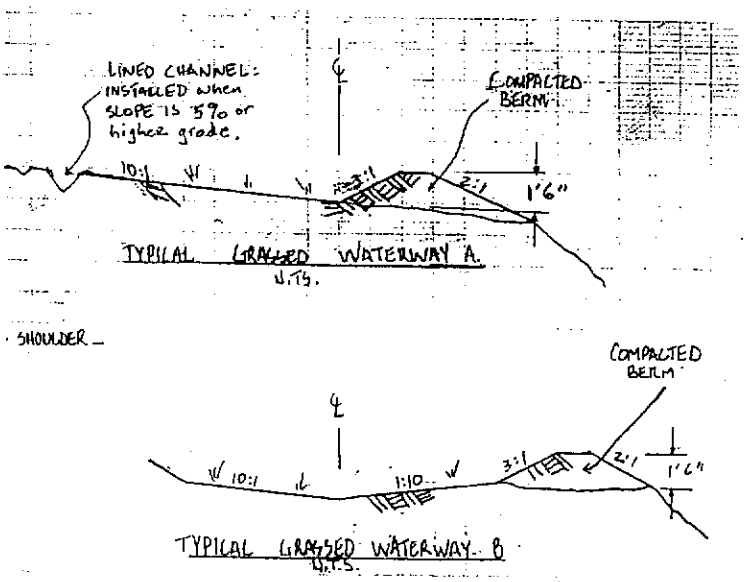
Typical Grassed Waterway Cross Section

USDA - NRCS

Sample Drawing: Grassed Waterway With Stone Center



(adapted from USDA, Soil Conservation Service, College Park, Maryland. Standards and Specifications for Soil Erosion and Sediment Control in Developing Areas. July 1975.)



Typical Grassed Waterway Cross Section

USDA - NRCS

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

LINED WATERWAY OR OUTLET
(feet)
CODE 468

DEFINITION

A waterway or outlet having an erosion-resistant lining of concrete, stone, synthetic turf reinforcement fabrics, or other permanent material. The earth above the permanent lining may be vegetated or otherwise protected.

Scope

This standard applies to waterways or outlets having linings of non-reinforced, cast-in-place concrete; flagstone mortared in place; rock riprap; or similar permanent linings. It does not apply to irrigation water conveyance, grassed waterways with stone centers or small lined sections to carry prolonged flows.

PURPOSE

This practice may be applied as part of a resource management system to support one or more of the following purposes:

- Provide for safe conveyance of runoff from conservation structures or other water concentrations without causing erosion or flooding
- Stabilize existing and prevent future gully erosion
- Protect and improve water quality

Properly designed linings may also control seepage, piping, and sloughing or slides.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies if the following or similar conditions exist:

1. Concentrated runoff, steep grades, wetness, prolonged base flow, seepage, or piping is such that a lining is needed to control erosion.
2. Use by people or animals precludes use of vegetation waterways or outlets.
3. Limited space is available for design width, which requires higher velocities and lining.
4. Soils are highly erosive or other soil or climatic conditions preclude using vegetation only.
5. Steep grades, wetness, prolonged base flow, seepage, or piping would cause erosion.
6. Installation of non-reinforced concrete or mortared flagstone linings, shall be made only on low shrink-swell soils that are well-drained or where subgrade facilities are installed.

CRITERIA

General Criteria Applicable To All Purposes

Capacity. The maximum capacity of the waterway flowing at designed depth shall not exceed 200 ft^3/s. The minimum capacity shall be adequate to carry the peak rate of runoff from a 10-year, 24-hour frequency storm. Velocity shall be computed by using Manning's Formula with a coefficient of roughness "n" as follows:

Lining	"n" Value
Concrete	
Trowel finish.....	0.012 – 0.014
Float finish.....	0.013 – 0.017
Shotcrete.....	0.016 – 0.022
Flagstone.....	0.020 – 0.025
1/ Riprap - (Angular Rock)	$n = 0.047(D_{50}\,S)^{0.147}$
Synthetic Turf Reinforcement Fabrics and Grid Pavers	Manufacturer's recommendations

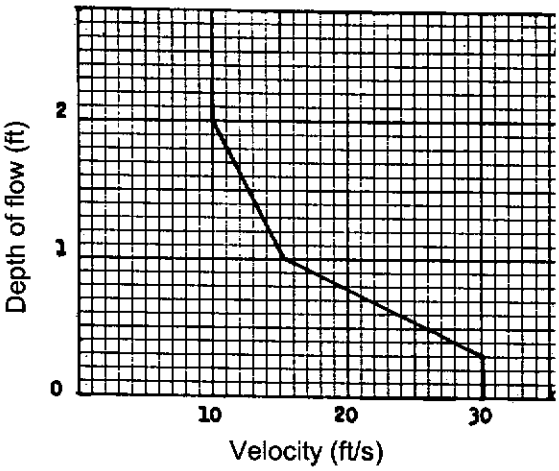
1/ Applies on slopes between 2 and 40% with a rock mantle thickness of 2 x D_{50} where:
D_{50} = median rock diameter (in.),
S = lined section slope (ft./ft.) ($.02 \leq S \leq .4$)

Velocity. Maximum design velocity and rock

gradation limits for rock riprap-lined channel sections shall be determined using Appendix 16A, Engineering Field Handbook unless a detailed design analysis appropriate to the specific slope, flow depth and hydraulic conditions indicate that a higher velocity is acceptable.

Maximum design velocity for concrete-lined sections should not exceed those using Figure 2.

Figure 2. Maximum velocity versus depth of flow for concrete-lined channels



Maximum design velocity for synthetic turf reinforcement fabrics and grid pavers shall not exceed manufacturer's recommendations.

Stable rock sizes and flow depths for rock-lined channels having gradients between 2 percent and 40 percent may be determined using the following detailed design process. This design process is from **Design of Rock Chutes** by Robinson, Rice, and Kadavy.

For channel slopes between 2% and 10%:

$$D_{50} = [q(S)^{1.5}/4.75(10)^{-3}]^{1/1.89}$$

For channel slopes between 10% and 40%:

$$D_{50} = [q(S)^{0.58}/3.93(10)^{-2}]^{1/1.89}$$

$$z = [n(q)/1.486(S)^{0.50}]^{3/5}$$

D_{50} = Particle size for which 50% of the sample is finer, in.

S = Bed slope, ft./ft.

z = Flow depth, ft.

q = Unit discharge, $ft^3/s/ft$ (Total discharge÷Bottom width)

Except for short transition sections, flow in the range of 0.7 to 1.3 of the critical slope must be avoided unless the channel is straight. Velocities exceeding critical velocity shall be restricted to straight reaches.

Waterways or outlets with velocities exceeding critical velocity shall discharge into an energy dissipator to reduce discharge velocity to less than critical.

Side slope. The steepest permissible side slopes, horizontal to vertical, shall be:

Nonreinforced concrete:
Hand-placed, formed concrete
Height of lining, 1.5 ft or less .....Vertical
Hand-placed screeded concrete or mortared in place flagstone
Height of lining, less that 2 ft .....1 to 1
Height of lining, more than 2 ft .....2 to 1
Slip form concrete:
Height of lining, less than 3 ft .....1 to 1
Rock riprap .....2 to 1
Synthetic Turf Reinforcement Fabrics ..2 to 1
Grid Pavers.....1 to 1

Cross section. The cross section shall be triangular, parabolic, or trapezoidal. Cross section made of monolithic concrete may be rectangular.

Freeboard. The minimum freeboard for lined waterways or outlets shall be 0.25 ft above design high water in areas where erosion-resistant vegetation cannot be grown adjacent to the paved or reinforced side slopes. No freeboard is required if vegetation can be grown and maintained.

Lining thickness. Minimum lining thickness shall be:

Concrete.....4 in. (In most problem areas, minimum thickness shall be 5 in. with welded wire fabric reinforcing.)
Rock riprap.....Maximum stone size plus thickness of filter or bedding
Flagstone.....4 in., including mortar bed
Synthetic Turf Reinforcement Fabrics and Grid Pavers.....Manufacturer's Recommendations

Lining Durability. Use of non-reinforced concrete or mortared flagstone linings shall be made only on low shrink-swell soils that are well drained or where subgrade drainage facilities are installed.

Related structures. Side inlets, drop structures, and energy dissipaters shall meet the hydraulic and structural requirements for the site.

Outlets. All lined waterways and outlets shall have a stable outlet with adequate capacity to prevent erosion and flooding damages.

Geotextiles. Geotextiles shall be used where appropriate as a separator between rock, flagstone, or concrete linings and soil to prevent migration of soil particles from the subgrade, through the lining material. Geotextiles shall be designed according to AASHTO M288, Section 7.3.

Filters or bedding. Filters or bedding shall be used where appropriate to prevent piping. Drains shall be used to reduce uplift pressure and to collect water, as required. Filters, bedding, and drains shall be designed according to NRCS standards. Weep holes may be used with drains if needed.

Concrete. Concrete used for lining shall be proportioned so that it is plastic enough for thorough consolidation and stiff enough to stay in place on side slopes. A dense durable product shall be required.

Specify a mix that can be certified as suitable to produce a minimum strength of 3,000 pounds per square inch. Cement used shall be Portland cement, Types I, II, or if required, Types IV or V. Aggregate shall have a maximum size of 1-1/2 inch.

Contraction joints. Contraction joints in concrete linings, if required, shall be formed transversely to a depth of about one-third the thickness of the lining at a uniform spacing in the range of 10 to 15 feet. Provide welded wire fabric or other uniform support to the joint to prevent unequal settlement.

Rock riprap of flagstone

Stone used for riprap shall be dense and hard enough to withstand exposure to air, water, freezing, and thawing. Flagstone shall be flat for ease of placement and have the strength to resist exposure and breaking.

Mortar

Mortar used for mortared in-place flagstone shall consist of a workable mix of cement, sand, and water with a water-cement ratio of not more than 6 gallons of water per bag of cement.

CONSIDERATIONS

Cultural resources need to be considered when planning this practice. Where appropriate, local cultural values need to be incorporated into practice design in a technically sound manner.

Consider adding widths of appropriate vegetation to the sides of the waterway for wildlife habitat.

Important wildlife habitat, such as woody cover or wetlands, should be avoided or protected if possible when siting the lined waterway. If trees and shrubs are incorporated, they should be retained or planted in the periphery of the grassed portion of the lined waterways so they do not interfere with hydraulic functions and roots do not damage the lined portion of the waterway. Mid- or tall bunch grasses and perennial forbs may also be planted along waterway margins to improve wildlife habitat. Waterways with these wildlife features are more beneficial when connecting other habitat types; e.g., riparian areas, wooded tracts and wetlands.

Provide livestock and vehicular crossings as necessary to prevent damage to the waterway. Crossing design shall not interfere with design flow capacity.

Establish filter strips on each side of the waterway to improve water quality.

When designing riprap linings and specifying rock gradations, consider that rock delivered to the site is often segregated by size or does not conform exactly to the specified gradation. Adequate safety factor should be incorporated.

Cultural Resources Considerations

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species of their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

1. Effects upon components of the water budget, especially effects on volumes and rates of runoff, infiltration, evaporation transpiration, deep percolation, and ground water recharge.
2. Variability of the practice's effect caused by seasonal and climatic changes.

Water Quality

1. Filtering effects of vegetation on the movement of sediment and dissolved and sediment attached substances will be evaluated.
2. Effects on the visual quality of the water resources.
3. Short-term and construction effects on the quality of water resources.

PLANS AND SPECIFICATIONS

Plans and specifications for lined waterways or outlets shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s).

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be provided to and reviewed with the landowner. The plan shall include the following items and others as appropriate.

A maintenance program shall be established to maintain waterway capacity and outlet stability. Lining damaged by machinery or erosion must be repaired promptly.

Inspect lined waterways regularly, especially following heavy rains. Damaged areas shall be repaired immediately. Remove sediment deposits to maintain capacity of lined waterways.

Landowners should be advised to avoid areas where forbs have been established when applying herbicides. Avoid using waterways as turn-rows during tillage and cultivation operations. Prescribed burning and mowing may be appropriate to enhance wildlife values, but must be conducted to avoid peak nesting seasons and reduced winter cover. Control noxious weeds. Do not use as a field road. Avoid crossing with heavy equipment.

REFERENCES

National Engineering Handbook, Part 650, Engineering Field Handbook: Chapter 16, Streambank and Shoreline Protection.

Robinson, K.M., C.E. Rice, and K.C. Kadavy. 1998. Design of Rock Chutes. Transactions of ASAE, Vol. 41(3): 621-626.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

468 - LINED WATERWAY OR OUTLET

I. SCOPE

The work shall consist of grading and shaping a waterway to the lines and grades as shown on the drawings, and includes furnishing and placing a lining of the type and thickness as specified.

II. MATERIALS

Concrete, when specified, will be placed in conformance with the requirements of Construction Specification 901 - Concrete.

Rock riprap, when specified, rock will be placed in conformance with the requirements of Construction Specification 907 - Rock Riprap.

Other materials, when specified other materials will be placed in conformance with the requirements of Special Construction Specifications to be attached to the drawings.

Geotextile fabric, when specified will conform to the required of Construction Specification 905 - Geotextile Fabric.

III. SITE PREPARATION

The foundation area shall be cleared of all trees, stumps, roots, brush, boulders, sod, debris, and other objectionable materials. All topsoil shall be removed and stockpiled until the needed for spreading over areas requiring vegetative cover. Removal operations shall be done in such a manner as to avoid damage to other trees and property.

IV. FOUNDATION

To shape the required cross-section, excavation shall be to the lines and grades as shown on the drawings, or as staked in the field. Subgrade shall be firm and free of water. Any earthfill required to bring subgrade to grade, shall be placed in layers not exceeding 8-inches, and compacted to the same density as the adjacent undisturbed material.

V. PLACEMENT

Placement of the lining materials shall be conformance of the Construction Specification as shown on the Practice Requirement sheet, and as shown on the drawings.

VI. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

VII. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

VIII. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENACE ITEMS

A properly operated and maintained lined waterway or an outlet for excess water is an asset to your farm. This lined waterway was designed and installed to safely remove or discharge excess water from your farm. The estimated life span of this installation is at least 10 years. The life of this practice can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic maintenance and may also require operational items to maintain satisfactory performance. Here are some recommendations to help you develop a good operation and maintenance program.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Check concrete surfaces for accelerated weathering, spalling, settlement, alignment or cracks. Repair

immediately as they may expose reinforcement and reduce the structure life.

Check metal surface for rust and other damage especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as protective covering.

Check all rock riprap section for accelerated weathering and displacement, as the rock was placed to prevent structural damage during the design flow. Replace to original grades if necessary.

Remove all foreign debris that hinders system operations.

Limit livestock usage to section that will not be hindered by their activity.

Maintain all fences to prevent livestock and unauthorized entry.

Other items specific to your project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

PIPELINE
(Feet)
CODE 516

DEFINITION

Pipeline having an inside diameter of 8 inches or less.

PURPOSES

To convey water from a source of supply to points of use for livestock, wildlife, or recreation.

CONDITIONS WHERE PRACTICE APPLIES

Where it is desirable or necessary to convey water in a closed conduit from one point to another.

CRITERIA

Capacity - For livestock water, the installation shall have a capacity to provide seasonal high daily water requirements for the number and species of animals to be supplied. Animal water requirements can be obtained from the NRCS Field Office Technical Guide.

For recreation areas, the water capacity shall be adequate for all planned uses. Typical examples are drinking water, fire protection, showers, flush toilets, and irrigation of landscaped areas.

Additional water capacity will be provided for wildlife when applicable.

Sanitary protection - If water from the pipeline is to be used for human consumption, applicable state and local regulations shall be met.

Pipe - All pipe must withstand the pressure it will be subjected to, including hydraulic transients, internal pressures and external pressures. As a safety factor against surge or water hammer, the working pressure should not exceed 72% of the pressure rating of the pipe and the design flow velocity at system capacity should not exceed 5 ft/sec. If either of these limits is exceeded, special consideration must be given to flow conditions and measures must be taken to adequately protect the pipeline against surge.

Steel pipe shall meet the requirements of AWWA Specification C-200 for 6 inch and larger diameter pipe or ASTM A53/A53M for pipes from 1/8 inch to 6 inches in diameter.

Plastic pipe shall conform to the requirements of the following ASTM specifications, as applicable:

D 1527 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80

D 1785 Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

D 2104 Polyethylene (PE) Plastic Pipe, Schedule 40

D 2239 Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter

D 2241 Poly(Vinyl Chloride) (PVC), Pressure-Rated Pipe (SDR Series)

D 2282 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)

D 2447 Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter

D 2513 Thermoplastic Gas Pressure Pipe, Tubing and Fittings

D 2737 Polyethylene (PE) Plastic Tubing

D 2672 Joints for IPS PVC Using Solvent Cement

D 3035 Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled outside Diameter

AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 12 inches

AWWA C901 Polyethylene (PE) Pressure Pipe and tubing, ½ inch through 3 inches

Plastic pressure pipefittings shall conform to the following ASTM specifications, as applicable:

D 2464 Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

D 2466 Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40

D 2467 Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

D 2468 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40

D 2609 Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe

D 2683 Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing

D 3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

D 3261 Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

Solvents for solvent-welded plastic pipe joints shall conform to the following ASTM specifications, as applicable:

D 2235 Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings

D 2564 Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems

D 2855 Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings

Rubber gaskets for pipe joints shall conform to the requirements of ASTM F477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

Drainage - Valves or unions shall be installed at low points in the pipeline so that the line can be drained as needed. Check valves shall be installed as needed to protect groundwater quality or maintain a full pipeline.

Vents - Design shall provide for entry and removal of air along the pipeline, as needed, to prevent air locking or pipe collapse. If parts of the line are above the hydraulic gradient, periodic use of an air pump may be required. Provisions shall be made for pressure relief, air relief and vacuum relief as needed to protect the pipeline.

Joints - Watertight joints that have a strength equal to that of the pipe shall be used. Couplings must be of material compatible with that of the pipe. If they are made of material susceptible to corrosion, provisions must be made to protect them.

Protection - When steel pipe is used, protective coatings shall be provided in accordance with NRCS Conservation Practice Standard 430FF, Steel Pipe.

Steel pipe installed above ground shall be galvanized or shall be protected with a suitable protective paint coating, including a primer coat and two or more final coats.

Plastic pipe installed above ground shall be resistant to ultraviolet light throughout the intended life of the pipe.

All pipes shall be protected from hazards presented by traffic, farm operations, freezing temperatures, fire, thermal expansion and contraction. Reasonable measures should be taken to protect the pipe from potential vandalism.

Vegetation - Disturbed areas shall be established with vegetation or otherwise stabilized as soon as practical after construction. Seedbed preparation, seeding, fertilizing, and mulching shall conform to NRCS Conservation Practice Standard 342, Critical Area Planting.

Visual resources - The visual design of pipelines and appurtenances in areas of high public visibility shall be carefully considered.

CONSIDERATIONS

Cultural Resources Considerations

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern, or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates that the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff and infiltration. Compare to centralized water facilities that have increased soil compaction because of traffic livestock, vehicles, and humans.

2. Effects on surface and ground water of broken pipelines.

Water Quality

1. The impact of water available at remote sites as a factor in keeping livestock out of streams and lakes, with the resulting reduction in bank erosion, sediment yield, and the direct deposit of manure in water courses.

2. Effects of bacteria, nutrients, salts and organic matter on surface and ground water because of increased recreation activity caused by the availability of water.

3. Effects of erosion and sediment yield from disturbed areas during construction.

PLANS AND SPECIFICATIONS

Plans and specifications for installing pipelines shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. If the pipeline is a component of a system that includes additional conservation practices, the information necessary to construct these additional practices will also be conveyed on the plans.

The Engineering Field Handbook, Chapter 5, will guide the development of plans.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan specific to the type of installed pipeline shall be provided to the landowner. The plan shall include, but not be limited to, the following provisions:

- Opening/closing valves to prevent excessive water hammer;
- Filling at the specified rate requirements;
- Inspecting and testing valves, pressure regulators, pumps, switches and other appurtenances;
- Maintaining erosion protection at outlets;
- Checking for debris, minerals, algae and other materials which may restrict system flow; and
- Draining and/or providing for cold weather operation of the system.

REFERENCES

Engineering Field Handbook

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

516 - PIPELINE

I. SCOPE

The work shall consist of furnishing and installing pipe including appurtenances at the locations and to the lines, grades, and elevations as shown on the drawings or as staked in the field.

II. PLACEMENT

Pipelines shall be placed so that they are protected against hazards imposed by traffic, farm operations, freezing temperatures, or soil cracking. Other means of protection must be provided if the depth required for protection is impracticable because of shallow soils over rock or for other reasons. Abrupt changes in grade must be avoided to prevent rupture of the pipe.

Trenches for plastic pipelines shall be free of rocks and other sharp-edged materials, and the pipe shall be carefully placed to prevent damage.

Plastic pipelines may be placed by plow in equipment if soils are suitable and rocks and boulders will not damage the pipe.

III. TESTING

Pipelines shall be pressure tested by one of the following methods:

A. Before backfilling, fill the pipe with water and test at the design working head or at a minimum head of 10 feet, whichever is greater. All leaks must be repaired, and the test must be repeated before backfilling.

B. Pressure test at the working pressure for 2 hours. The allowable leakage shall not be greater than 1 gallon per diameter inch per mile. If the test exceeds this rate, the defect must be repaired until retests show that the leakage is within the allowable limits, but all visible leaks must be repaired.

IV. BACKFILLING

All backfilling shall be completed before the line is placed in service. For plastic or copper pipe, the initial backfill shall be of selected material that is free of rocks or other sharp edged material that can damage the pipe. Deformation or displacement of the pipe must not occur during backfilling.

Plastic pipelines installed by the plow in method require surface compaction and shaping in addition to the normal plow in operations.

V. MATERIAL

A. Pipe - The pipe shall be of the size and conform to the requirements of the specification listed on the "Practice Requirement" sheet.

B. Appurtenances - All appurtenances shall conform to the specifications listed on the "Practice Requirement" sheet and to the size and dimensions as shown on the drawings.

VI. VALVES, VENTS, JOINTS

Valves or unions shall be installed at low points in the pipeline so that the line can be drained as needed.

Air Vents shall be installed at the locations shown on the drawings.

Watertight joints that have the strength equal to that of the pipe shall be used. Couplings must be of material compatible with that of the pipe. If they are made of material susceptible to corrosion, provisions must be made to protect them.

VII. BASIS OF ACCEPTANCE

The acceptability of the pipeline shall be determined by inspections to insure compliance with all the provisions of this specification with respect to the design of the line, the pipe and pipe markings, the appurtenances, and the minimum installation requirements.

The installing contractor shall certify that the installation complies with the requirements of the specification. A written guarantee shall be furnished that protects the owner against defective workmanship and materials for not less than 1 year. The certification identifies the manufacturer and markings of the pipe used.

VIII. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

IX. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

X. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained pipeline is an asset to your farm. This pipeline was designed and installed to transfer water to where it may be utilized. The estimated life span of this installation is at least 10 years. The life of this installation can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic maintenance and may also require operational items to maintain satisfactory performance. Here are some recommendations.

Check to make sure all valves and air vents are in and set at the operating condition.

Maintain the design depth of cover over the pipeline.

Limit traffic over the pipeline to designated sections that were designed for traffic loads.

Avoid travel over pipelines by tillage equipment when the soil is saturated.

Avoid any subsoiling operation that may disturb the pipeline.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Remove all foreign debris that hinders system operation.

Drain all system components in areas that are subject to freezing. If parts of the system cannot be drained, an anti-freeze solution may be added.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Immediately repair any vandalism, vehicular, or livestock damage to any outlets and appurtenances.

Other items specific to your project are listed on the "Practice Requirements" sheet.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SEDIMENT BASIN

(No.)
CODE 350

DEFINITION

A basin constructed to collect and store debris or sediment.

Scope

This standard applies to the installation of all basins where the primary purpose is to trap and store waterborne sediment and debris.

PURPOSES

To preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams; to prevent undesirable deposition on bottom lands and developed areas; to trap sediment originating from construction sites; and to reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where physical conditions or land ownership preclude treatment of a sediment source by the installation of erosion-control measures to keep soil and other material in place or where a sediment basin offers the most practical solution to the problem.

CRITERIA

The capacity of the sediment basin shall equal the volume of sediment expected to be trapped at the site during the planned useful life of the basin or the improvements it is designed to protect. If it is determined that periodic removal of sediment will be practicable, the capacity may be proportionately reduced.

The design of dams, spillways, and drainage facilities shall be according to NRCS standards for ponds (378) and grade stabilization structures (410) or according to the requirements in TR-60, as appropriate for the class and kind of structure being considered.

Temporary basins having drainage areas of 5 acres or less and a total embankment height of 5 ft or less may be designed with less conservative criteria if conditions warrant. The embankment shall have a minimum top width of 4 ft and side slopes of 2:1 or flatter. An outlet shall be provided of earth, pipe, stone, or other devices adequate to keep the sediment in the trap and to handle the 10-year-frequency discharge without failure or significant erosion.

Provisions shall be made for draining sediment pools if necessary for safety and vector control. Fencing and other safety measures shall be installed as necessary to protect the public from floodwater and soft sediment. Due consideration shall be given to good visual resource management.

CONSIDERATIONS

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and groundwater recharge.

2. Effects on downstream flows and aquifers that would affect other water uses and users.

3. Effects on volume of discharge flow on the environmental, social, and economic conditions.

4. Effects on the water table downstream and the results of changes of vegetative growth.

Water Quality

1. Effects on erosion, movement of sediment, pathogens, and soluble and sediment-attached substances that could be carried by runoff.

2. Effects on the visual quality of onsite and downstream water resources.

3. Effects of construction and early establishment of protective vegetation on the surface and ground water.

4. Effects on wetlands and water-related wildlife habitats.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that critical periods, such as spawning, eggs in gravels, and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

PLANS AND SPECIFICATIONS

Plans and specifications for installing sediment basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

NRCS, CA
July, 2000

OPERATION AND MAINTENANCE

An operation and maintenance plan must be prepared by the Designer for use by the owner or other responsible for operating this practice. The plan should provide specific instructions for operating and maintaining the system to insure that it functions properly. It should also provide for periodic inspections and prompt repair or replacement of damage components.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SPRING DEVELOPMENT
(No.)
CODE 574

DEFINITION

Utilizing springs and seeps to provide water for a conservation need.

PURPOSES

This practice may be applied as part of a resource management system to support one or more of the following purposes:

- Improve the distribution of water;
- Increase the quantity and improve the quality of water for livestock, wildlife, or other uses;
- Obtain water for irrigation if water is available in a suitable quantity and quality.

CONDITIONS WHERE PRACTICE APPLIES

In areas where spring or seep development will provide a dependable supply of suitable water for the planned times of use, and where the intended purpose can be achieved by using this practice alone or combined with other conservation practices.

This standard includes the drilling of horizontal wells into water-bearing formations.

CRITERIA

General Criteria Applicable to All Purposes

Spring developments shall be planned, designed, and constructed in compliance with Federal, Tribal, State, and Local laws and regulations.

Impacts to existing wetland functions shall be assessed. USDA wetland conservation provisions apply. The practice must comply with NRCS wetland technical assistance policy contained in the General Manual, GM 190 (Ecological Sciences), Part 410.26 (Compliance with NEPA- Protection of Wetlands; online at http://policy.nrcs.usda.gov/scripts/lpsiis.dll/GM/GM_190_410_b.htm).

An investigation of site conditions, including soil borings, shall be made. Water quality shall be determined to extent required for the intended purpose. Water quantity shall be measured from existing flows, as practicable when needed, to determine if the development will meet requirements.

Fractured or tubular springs - This type of spring is associated with cavernous rock. If water issues from rock fractures, the individual openings shall be cleaned and enlarged, as needed, to improve flow. The water from these individual openings shall be collected by means of tile or perforated pipeline, or by a gravel-filled ditch. The collection works shall be constructed an adequate distance below the elevation of the openings to permit free discharge.

If water issues from a single opening, such as a solution channel in a soluble rock formation or a tunnel in lava, the opening shall be cleaned or enlarged as needed. A collection system usually is not required.

Perched or contact springs - Perched or contact springs occur where an impermeable layer lies beneath a water-bearing permeable layer. Collection trenches shall be used to intercept and divert flows from the water-bearing formation.

Artesian springs - Artesian springs normally occur at a fissure or break in the impervious stratum, with the water source being an underlying pervious water-bearing layer so positioned that the water surface elevation (water table) is always above the outlet point of the spring.

Remove obstructions, clean or enlarge joints or fractures, or lower the outlet elevation as needed to improve flow. Sumps or spring boxes shall be located as needed. Free outlet discharge or minimum restriction to the spring flow is required to protect and maintain yield.

Collection systems - If a collection trench is used, the trench shall be excavated so that it extends into the impervious layer. The minimum length of the trench shall be based on site conditions and pipe length to collect the amount of needed water. The pipe length and area of disturbance shall be kept as small as practical to collect the needed water.

A cutoff wall shall be constructed along the downstream side of the trench, if needed to insure that the flow enters the collection system. The cutoff wall

may be constructed of plastic sheeting, well-tamped clay, masonry, concrete, or other impervious materials.

The collection system shall consist of subsurface drainage tubing or perforated pipe not less than four-inches in diameter, a wood box drain, or other suitable manufactured system. Surrounding the collector with geotextile fabric or a sand-gravel filter is recommended. Cleanouts are recommended for all collection systems.

Crushed rock or gravel backfill, not less than one foot thick, may be used as a collection system if site conditions warrant, in lieu of other materials. Sand, gravel, and crushed rock shall be composed of clean, hard, durable particles.

Spring boxes - Spring boxes, if needed, shall be made of plastic, concrete, or other durable material, with a tight access cover and impervious floor. A "shoebox" type access cover or manhole attachment, with gasket, is recommended for tightness. The floor may be omitted where the underlying material is stable and impervious.

The boxes shall have a minimum cross-sectional area of 1 ½ ft^2, and the floor of the box shall not be less than six inches below the outlet of the collection system.

Spring box overflows, if needed, shall meet the requirements found in NRCS Conservation Practice Standard 614, Watering Facility.

Outlets. The outlet pipe from the spring box shall be placed not less than six inches above the floor, to provide a sediment trap. The spring outlet pipe should be at the same elevation or lower than the collector pipe outlet to prevent reduced spring flow. The intake to the outlet pipe shall be screened as necessary, and installed to the box with a watertight connection.

The outlet pipe must have a positive grade away from the spring box or collection system unless the vent pipe(s) are added to prevent air locks.

The outlet pipe shall have a minimum 1 ¼ inch (3 cm) diameter. In lieu of site-specific spring flow and pipe vent calculations, the outlet pipe shall have the following minimum size based on line grades:

1. 1 ¼ inches inside diameter for line grades greater than 1.0 percent;
2. 1 ½ inches inside diameter for line grades greater than or equal to 0.5 percent but less than or equal to 1.0 percent;
3. Two inches inside diameter for grade lines less than 0.5 percent.

Pipe beyond three feet from the outlet may be sized per applicable criteria in NRCS Conservation Practice Standard 516, Pipeline. Minimum outlet pipe material and strength requirements shall equal those found in NRCS Conservation Practice Standard 616, Pipeline.

Appurtenance Protection - Measures shall be included to protect appurtenances from damage by freezing, flooding, sedimentation, contamination, vehicular traffic, and livestock.

Wildlife Habitat Protection - Spring developments with the potential to jeopardize wetlands, bogs, fens, or other unique ecological sites shall be designed with measures required to maintain the existing habitat, unless acceptable mitigation is provided. A functional assessment will be made at potential spring development areas to determine existing ecological functions and/or potential losses.

Vegetative Establishment - Establishing vegetation on disturbed areas shall be in accordance with NRCS Conservation Practice Standard 342, Critical Area Planting.

Horizontal Wells - A horizontal rotary method of drilling shall be used with recirculating water to remove drill cuttings. The hole shall be drilled on a downward slope of at least four percent (one-half inch drop per foot of length) and have a minimum diameter of 1 ¼ inches.

After water is encountered, the hole shall be cased with standard two-inch pipe drilled a minimum of 18 feet into unconsolidated soil formations (or 2/3 of the total hole length, whichever is less), or a minimum of five feet into tight, consolidated rock formations overlying the water-bearing material. The casing shall be cemented in place by pressure grouting the annular space between the casing and the surrounding soil or rock with a cement slurry for a tight seal. This is done to prevent groundwater losses along the outside of the casing, and to reduce the risk of groundwater contamination. Allow at least 12 hours for the slurry to set before resuming drilling to the desired length.

After a satisfactory supply of water is established, a pipe liner with a minimum diameter of 1 ¼ inches and slots or perforations opposite the water-bearing formation shall be inserted to keep the hole open and to facilitate flow to the outlet.

The horizontal well shall be completed by installing a tee at the end of the casing, and installing an in-line valve for controlling the water flow and a vacuum relief valve to prevent a vacuum from developing in the casing pipe.

CONSIDERATIONS

Potential damage to wetlands, woody cover, and existing wildlife habitat.

Where feasible and appropriate, replant using native vegetation adapted to wet conditions.

Cultural Resources Considerations

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

1. Potential changes in surface water quantity, especially base flow. Factor in the removal of obstructions and vegetation in the spring area;
2. Potential changes in subsurface water supply, including the possibility of declining yields from the project spring as well as other springs or wells that tap the same water source;
3. A shutoff valve and vent system on the spring outlet pipe should be considered for non-water use periods, system shutdown, flow control, and maintenance;
4. Consider using flow controllers/restrictors on pipelines and/or floats on water facilities to reduce water withdrawal from the spring source and/or provide additional water to the overflow area at the spring site.

Water Quality

1. Potential water quality degradation associated with spring development, including increased utilization. Where appropriate, consider measures (such as fencing) to avoid or reduce trampling the spring area by wildlife and/or livestock;
2. Potential temporary degradation of water quality caused by erosion and sedimentation from the area disturbed during construction.

PLANS AND SPECIFICATIONS

Plans and specifications for installing spring developments shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The drawings and specifications shall show location, collection system details (including pipe size and type), spring box and outlet details, and fencing as applicable. Identify areas that are not to be disturbed.

OPERATION AND MAINTENANCE

The operations and maintenance of the system shall include such items as winter freeze and flooding protection, overflow and valve operations, spring box sediment and debris removal, rodent damage repair, maintaining vegetative cover, providing for outlet stability, and other items as needed.

Operation and maintenance plans for ecologically sensitive sites shall include specific valve installation and operation requirements to protect existing site habitat values.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

574 - SPRING DEVELOPMENT

I. SCOPE

The work shall consist of constructing a water collection system from a spring as shown on the drawings or as staked in the field.

II. SITE PREPARATION

All loose rock, sediment, logs and vegetation that obstruct the free discharge of the spring shall be removed.

The use of explosives for excavation of the spring shall not be permitted.

III. SPRING WATER COLLECTION SYSTEM

The spring water collection system, trenches, drain tiles, perforated pipelines, sumps, and spring boxes shall be constructed to the lines, grades, dimensions and of the materials shown on the drawings.

Crushed rock or gravel for collection systems and sand-gravel material for filters shall be composed of clean, hard particles.

IV. APPURTENANT SYSTEMS

Storage tanks, water troughs or other facilities for beneficial use of the water shall be constructed as shown on the drawings or as staked in the field.

V. PROTECTIVE MEASURES

All works shall be adequately protected from damage by freezing, flooding, sedimentation or contamination by livestock.

VI. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

VII. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

VIII. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained spring development is an asset to your farm. This spring development was designed and installed to collect and discharge water for beneficial use. The estimated life span of this installation is at least 10 years. The life of this installation can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Here are some recommendations to help you develop a good operation and maintenance program.

Maintain all fences in good condition to exclude livestock from collection and storage systems.

Maintain covers and seals to prevent insects and rodents from contact with the water.

Precaution and care is needed to prevent herbicides, insecticides and other pollutants from contamination of the water.

NRCS, CA
October 2002

Limit the use of any fertilizer to the watershed area.

Protect system and components from damage by freezing.

Immediately repair any vandalism, vehicular or livestock.

Other items specific to your project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

STREAMBANK AND ~~SHORELINE~~ PROTECTION

(Ft)

CODE 580

DEFINITION

Treatment(s) used to stabilize and protect banks of streams or constructed channels, and shorelines of lakes, reservoirs, or estuaries.

SCOPE

This standard applies to measures used to stabilize and protect the banks of streams, lakes, estuaries, and excavated channels. It does not apply to erosion problems on main ocean fronts and similar areas of complexity not normally within the scope of NRCS authority or expertise. All revetments, bulkheads, or groins are to be no higher than 3 ft. above mean high tide or, or in nontidal areas, no higher than 3 ft. above mean high water.

PURPOSE

- To prevent the loss of land or damage to land uses, or other facilities adjacent to the banks, including the protection of known historical, archeological, and traditional cultural properties.
- To maintain the flow or storage capacity of the water body or to reduce the offsite or downstream effects of sediment resulting from bank erosion.
- To improve or enhance the stream corridor for fish and wildlife habitat, aesthetics, recreation.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to streambanks of natural or constructed channels ~~and shorelines of lakes, reservoirs, or estuaries where they are susceptible to erosion~~. It applies to controlling erosion where the problem can be solved with relatively simple structural measures, vegetation, or upland erosion control practices. It does not apply to erosion problems on main ocean fronts and similar areas of complexity not normally within the scope of NRCS authority or expertise.

CRITERIA

General Criteria Applicable to All Purposes

Measures must be installed according to a site-specific plan and in accordance with all applicable local, state, and federal laws and regulations.

Protective measures to be applied shall be compatible with improvements planned or being carried out by others.

Protective measures shall be compatible with the bank or ~~shoreline materia~~ls, water chemistry, channel or lake hydraulics, and slope characteristics both above and below the water line.

End sections shall be adequately bonded to existing measures, terminate in stable areas, or be otherwise stabilized.

Protective measures shall be installed on stable slopes. Bank or shoreline materials and type of measure installed shall determine maximum slopes.

Designs will provide for protection from upslope runoff.

Internal drainage for bank seepage shall be provided when needed. Geotextiles or properly designed filter bedding shall be used on structural measures where there is the potential for migration of material from behind the measure.

Measures applied shall not adversely affect threatened and endangered species nor species of special concern as defined by the appropriate state and federal agencies.

Measures shall be designed for anticipated ice action and fluctuating water levels.

All disturbed areas around protective measures shall be protected from erosion. Disturbed areas that are not to be cultivated shall be protected as soon as practical after construction. Vegetation shall be selected that is best suited for the soil/moisture regime.

Additional Criteria for Streambanks

The channel grade shall be stable based on a field assessment before any permanent type of bank protection can be considered feasible, unless the protection can be constructed to a depth below the anticipated lowest depth of streambed scour.

Streambank protection shall be started at a stabilized or controlled point and ended at a stabilized or controlled point on the stream.

A protective toe shall be provided based on an evaluation of stream bed and bank stability.

Channel clearing to remove stumps, fallen trees, debris, and bars shall only be done when they are causing or could cause detrimental bank erosion or structural failure. Habitat forming elements that provide cover, food, and pools, and water turbulence shall be retained or replaced to the extent possible.

Changes in channel alignment shall not be made unless the changes are based on an evaluation that includes an assessment of both upstream and downstream fluvial geomorphology. The current and future discharge-sediment regime shall be based on an assessment of the watershed above the proposed channel alignment.

Measures shall be functional for the design flow and sustainable for higher flow conditions based on acceptable risk.

Measures shall be designed to avoid an increase in natural erosion downstream.

Measures planned shall not limit stream flow access to the floodplain.

Stream segments to be protected shall be classified according to a system deemed appropriate by the state. Segments that are incised or contain the 5-year return period (20 percent probability) or greater flows shall be evaluated for further degradation or aggradation.

When water surface elevations are a concern, the effects of protective measures shall not increase flow levels above those that existed prior to installation.

Side Slopes:

Minimum side slopes for various types of streambank protection are as follows:

~~Rock riprap~~	~~2:1~~
~~Rock and wire mattress~~	2:1
~~Sacked~~ concrete	~~1:1~~

Footings:

Bank protection measures shall extend below the channel bottom, on the same slope as the bank, a minimum vertical distance of three feet except where bottom materials are non-erosive or stable.

Drainage:

Weep holes shall be provided at 10 foot intervals for impervious linings and should be backed by no less than one cubic foot of permeable drainage material.

Additional Criteria for Shorelines

All revetments, bulkheads, or groins are to be no higher than 3 feet (1 meter) above mean high tide, or mean high water in non-tidal areas.

Structural shoreline protective measures shall be keyed to a depth to prevent scour during low water.

For the design of structural measures, the site characteristics below the waterline shall be evaluated for a minimum of 50 ft (15 meters) horizontal distance from the shoreline measured at the design water surface.

The height of the protection shall be based on the design water surface plus the computed wave height and freeboard. The design water surface in tidal areas shall be mean high tide.

When vegetation is selected as the protective treatment, a temporary breakwater shall be used during establishment when wave run up would damage the vegetation.

Additional Criteria for Stream Corridor Improvement

Stream corridor vegetative components shall be established as necessary for ecosystem functioning and stability. The appropriate composition of vegetative components is a key element in preventing excess long-term channel migration in re-established stream corridors.

Measures shall be designed to achieve any habitat and population objectives for fish and wildlife species or communities of concern as determined by a site-specific assessment or management plan. Objectives are based on the survival and reproductive needs of populations and communities, which include habitat diversity, habitat linkages, daily and seasonal habitat ranges, limiting factors and native plant communities. The type, amount, and distribution of vegetation shall be based on the requirements of the fish and wildlife species or communities of concern to the extent possible.

Measures shall be designed to meet any aesthetic objectives as determined by a site-specific assessment or management plan. Aesthetic objectives are based on human needs, including visual quality, noise control, and microclimate control. Construction materials, grading practices, and other site development elements shall be selected and designed to be compatible with adjacent land uses.

Measures shall be designed to achieve any recreation objectives as determined by a site-specific assessment or management plan. Recreation objectives are based on type of human use and safety requirements.

CONSIDERATIONS

An assessment of streambank or shoreline protection needs should be made in sufficient detail to identify the causes contributing to the instability (e.g. watershed alterations resulting in significant modifications of discharge or sediment production). Due to the complexity of such an assessment an interdisciplinary team should be utilized.

When designing protective measures, consider the changes that may occur in the

watershed hydrology and sedimentation over the design life of the measure.

Consider utilizing debris removed from the channel or streambank into the treatment design.

Use construction materials, grading practices, vegetation, and other site development elements that minimize visual impacts and maintain or complement existing landscape uses such as pedestrian paths, climate controls, buffers, etc. Avoid excessive disturbance and compaction of the site during installation.

Utilize vegetative species that are native and/or compatible with local ecosystems. Avoid introduced or exotic species that could become nuisances. Consider species that have multiple values such as those suited for biomass, nuts, fruit, browse, nesting, aesthetics and tolerance to locally used herbicides. Avoid species that may be alternate hosts to disease or undesirable pests. Species diversity should be considered to avoid loss of function due to species-specific pests. Species on noxious plant lists should not be used.

Livestock exclusion should be considered during establishment of vegetative measures and appropriate grazing practices applied after establishment to maintain plant community integrity. Wildlife may also need to be controlled during establishment of vegetative measures. Temporary and local population control methods should be used with caution and within state and local regulations.

Measures that promote beneficial sediment deposition and the filtering of sediment, sediment-attached, and dissolved substances should be considered.

Consider maintaining or improving the habitat value for fish and wildlife, including lowering or moderating water temperature, and improving water quality.

Consideration should be given to protecting side channel inlets and outlets from erosion.

Toe rock should be large enough to provide a stable base and graded to provide aquatic habitat.

Consider maximizing adjacent wetland functions and values with the project design and minimize adverse effects to existing wetland functions and values.

When appropriate, establish a buffer strip and/or diversion at the top of the bank or shoreline protection zone to help maintain and protect installed measures, improve their function, filter out sediments, nutrients, and pollutants from runoff, and provide additional wildlife habitat.

Consider conservation and stabilization of archeological, historic, structural and traditional cultural properties when applicable.

Measures should be designed to minimize safety hazards to boaters, swimmers, or people using the shoreline or streambank.

Protective measures should be self-sustaining or require minimum maintenance.

Water Quantity

This practice will have only a minor effect on the quantity of surface and ground water.

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, deep percolation, and ground water recharge.
2. Effects on downstream flows and aquifers that affect other uses and users.
3. Effects on the water table of adjoining fields.
4. Effects on the interflow discharge into streams.

Water Quality

This practice will decrease the flow and base of the stream on which it is applied to protect the stream banks. When it is installed to protect shorelines, there can be local enhancement of the water quality, but

generally the shoreline is protected and the benefits on water quality are slight.

1. Filtering effects of vegetation on movement of sediment, and sediment-attached and dissolved substances.

2. Effects on erosion and movement of sediment, and soluble and sediment-attached substances carried by runoff and streamflow.

3. Effects on the visual quality of onsite and downstream water resources.

4. Effects of construction and vegetation establishment on quality.

5. Effects of changes in water temperatures.

6. Short-term and long-term effects on wetlands and water-related wildlife habitats.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that critical periods, such as spawning, eggs in gravels and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example, there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

PLANS AND SPECIFICATIONS

Plans and specifications for streambank and shoreline protection shall be prepared for specific field sites and based on this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be prepared for use by the owner or others responsible for operating and maintaining the system. The plan shall provide specific instructions for operating and maintaining the system to insure that it functions properly. It shall also provide for periodic inspections and prompt repair or

replacement of damaged components or erosion.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

580 - STREAMBANK PROTECTION

I. SCOPE

The work shall consist of furnishing of materials and constructing streambank protection measures to the lines, grades, elevations and dimensions as shown on the drawings or as staked in the field.

II. SITE PREPARATION

Trees and brush on the banks as marked in the field or shown on the drawings shall be removed and disposed of in designated areas. Removal of any trees and brush shall be done in such a manner as to avoid damage to other trees and property. Disposal of trees, brush, and other materials shall be performed to have the least detrimental effect on the environment.

Fallen trees, stumps, debris, minor ledge outcroppings and sand and gravel bars as shown on the drawings shall be removed and disposed of in designated areas.

Clearing and disposal methods shall be in accordance with state and county laws with due regard to the safety of persons and property.

III. BANK PROTECTION MEASURES

The type and extent of bank protection measures shall conform to the structural requirements of the specifications listed on the Practice Requirements sheet.

IV. FENCING

Fencing shall be installed at locations and of the materials shown on the drawings.

V. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

VI. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

VII. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained streambank or shoreline protection is an asset to your farm. The streambank or shoreline protection was designed and installed to stabilize an eroding area. The estimated life span of this installation is at least 10 years. The life of this installation can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic maintenance and may also require operational items to maintain satisfactory performance. Here are some recommendations to help you develop a good operation and maintenance program.

Check all rock riprap sections for accelerated weathering and displacement. Replace to original grades if necessary.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

NRCS, CA
July, 2000

All settlement or cracks in the soil should be investigated to determine the cause and immediately repaired.

If fences are installed, they shall be maintained to prevent unauthorized or livestock entry.

Removal of debris that may accumulate at this section, and immediately upstream or downstream from this installation.

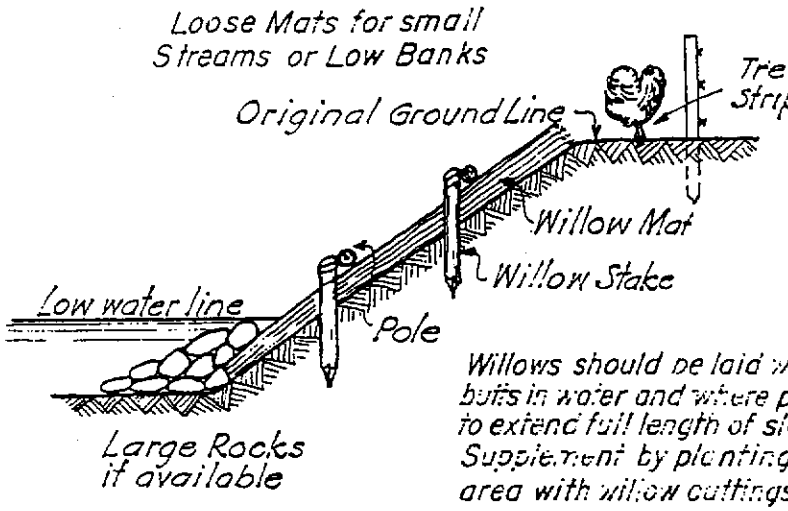
Control livestock access on unfenced areas.

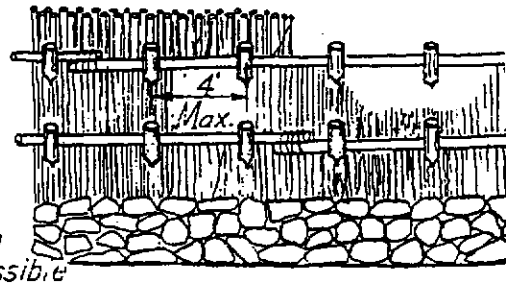
Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Immediately repair any vandalism, vehicular, or livestock damage.

Other items specific to your project are listed on the "Practice Requirement" sheet.

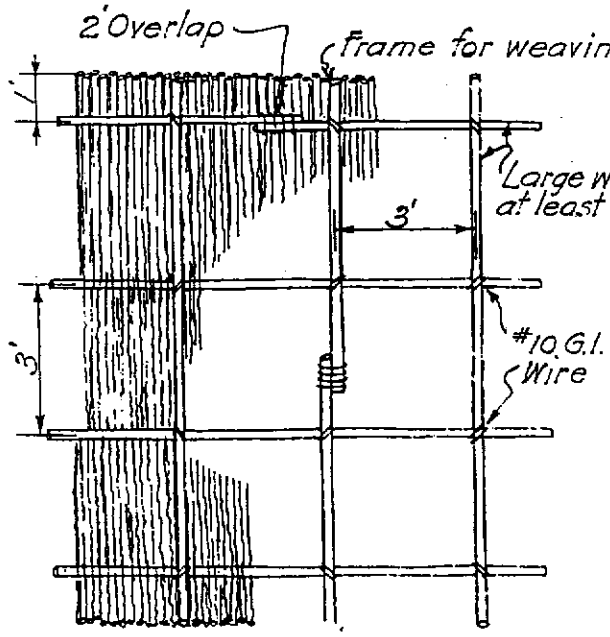
WILLOW

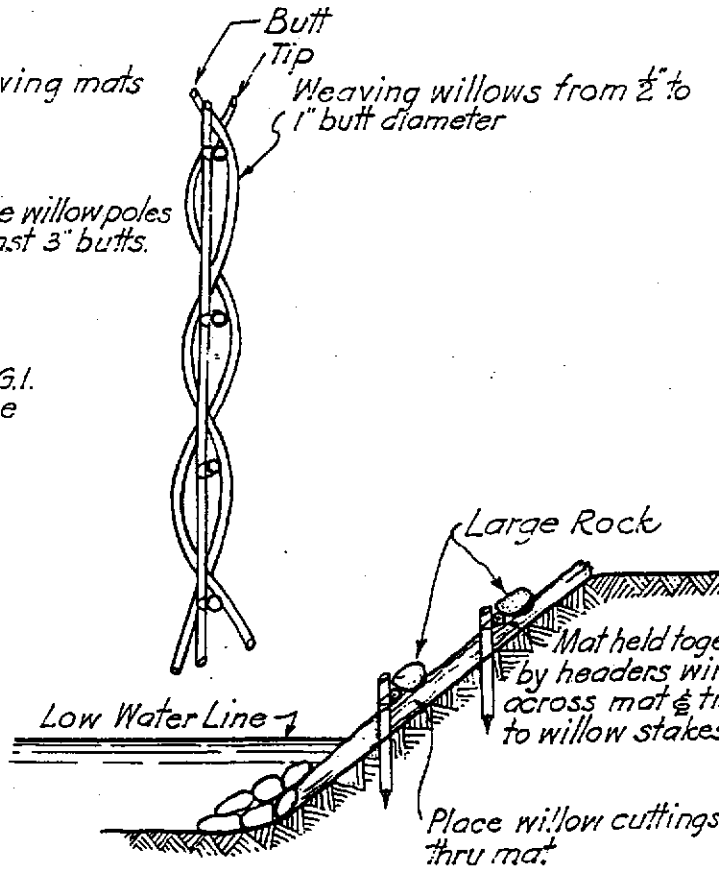




Willows should be laid with butts in water and where possible to extend full length of slope. Supplement by planting matted area with willow cuttings.

WOVEN WILLOW MATS



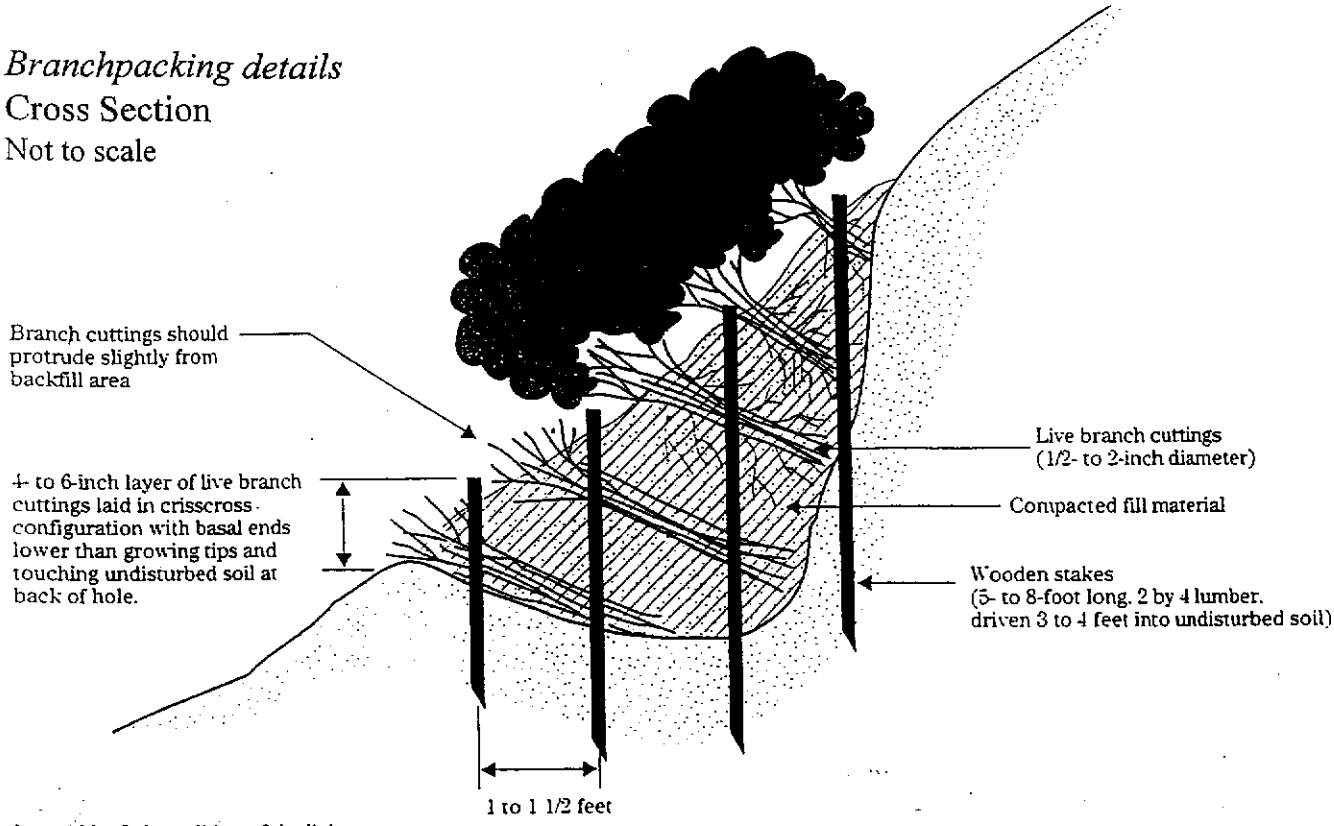


These mats can be constructed at the cutting site and transported by truck to stream bank. The sections may be made in any convenient size as long as they fit the sloped embankment. Care should be taken in handling willows to prevent injury to buds or bark.

Typical Streambank Protection

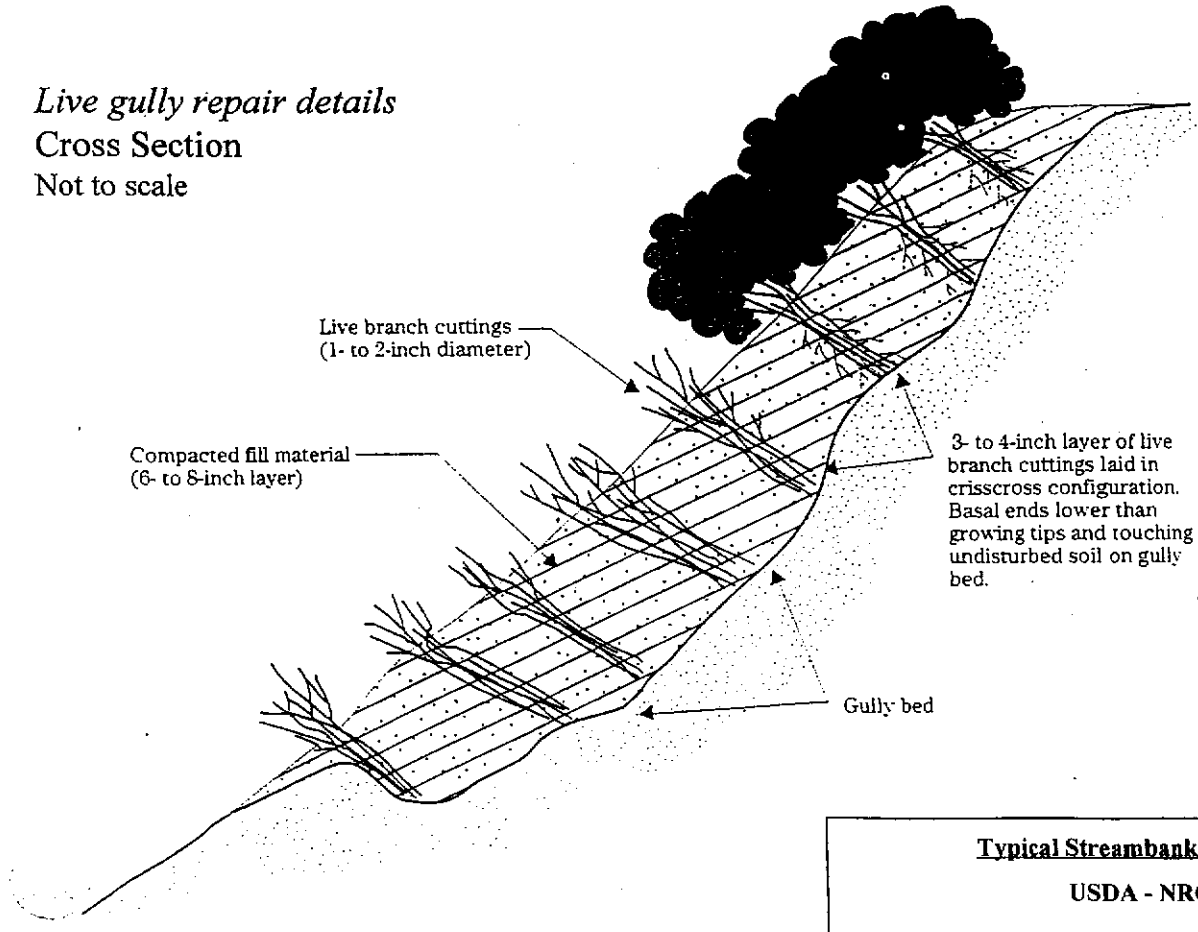
USDA - NRCS

Branchpacking details
Cross Section
Not to scale



Rooted leafed condition of the living plant material is not representative of the time of installation.

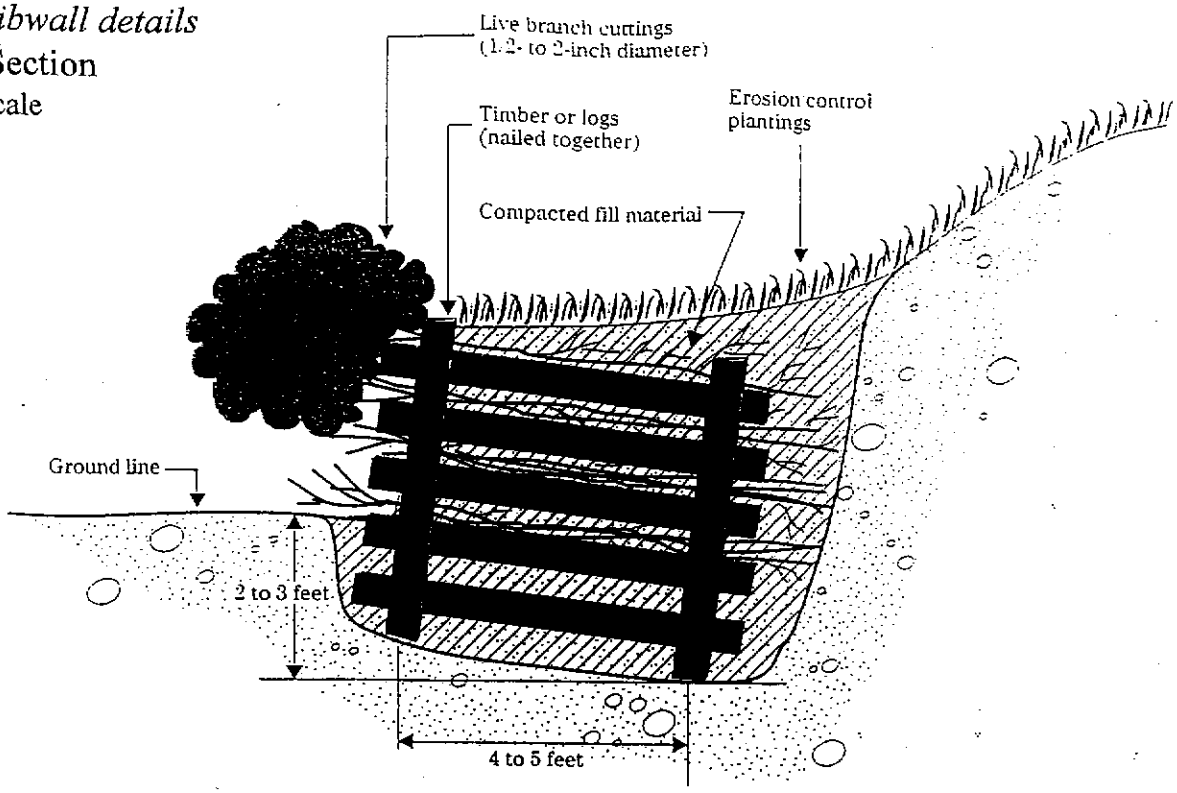
Live gully repair details
Cross Section
Not to scale



Typical Streambank Protection

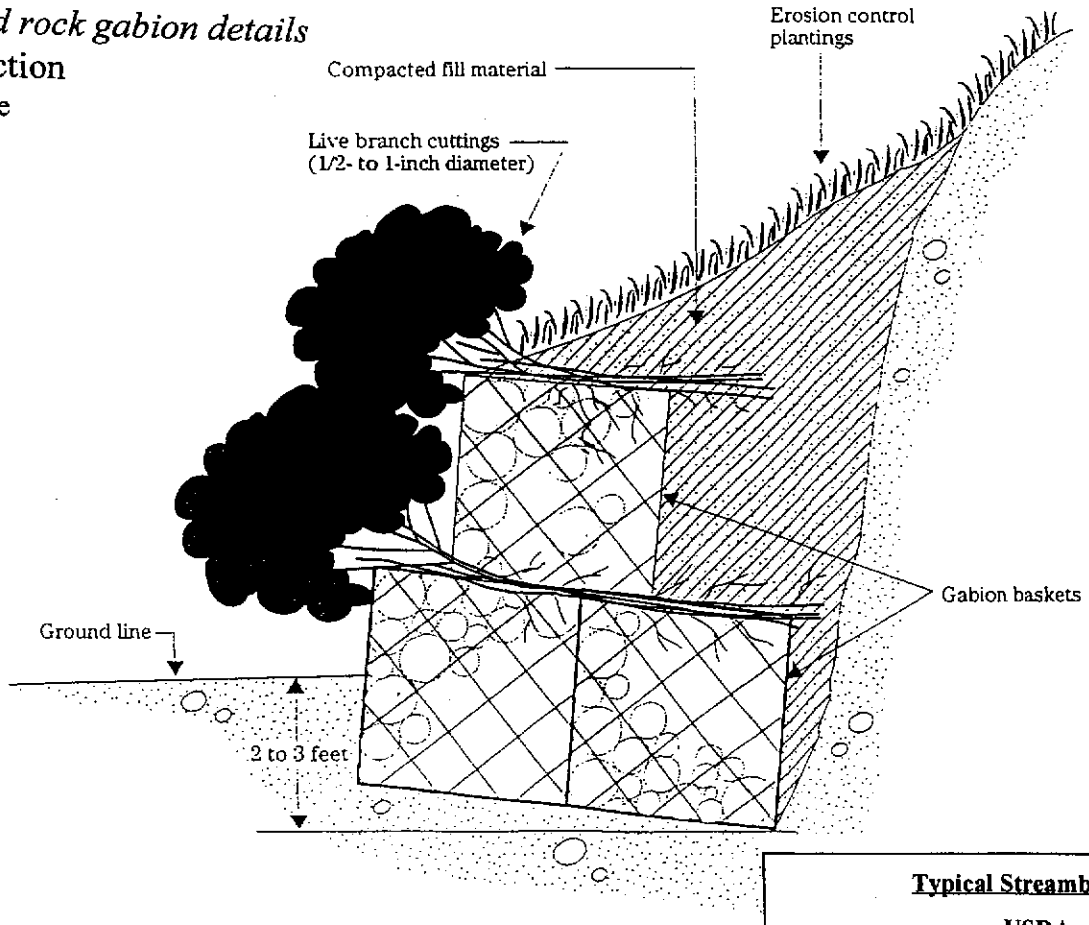
USDA - NRCS

Live cribwall details
Cross Section
Not to scale



Note:
Rooted/leafed condition of the living plant material is not representative of the time of installation.

Vegetated rock gabion details
Cross Section
Not to scale



Note:
Rooted/leafed condition of the living plant material is not representative of the time of installation.

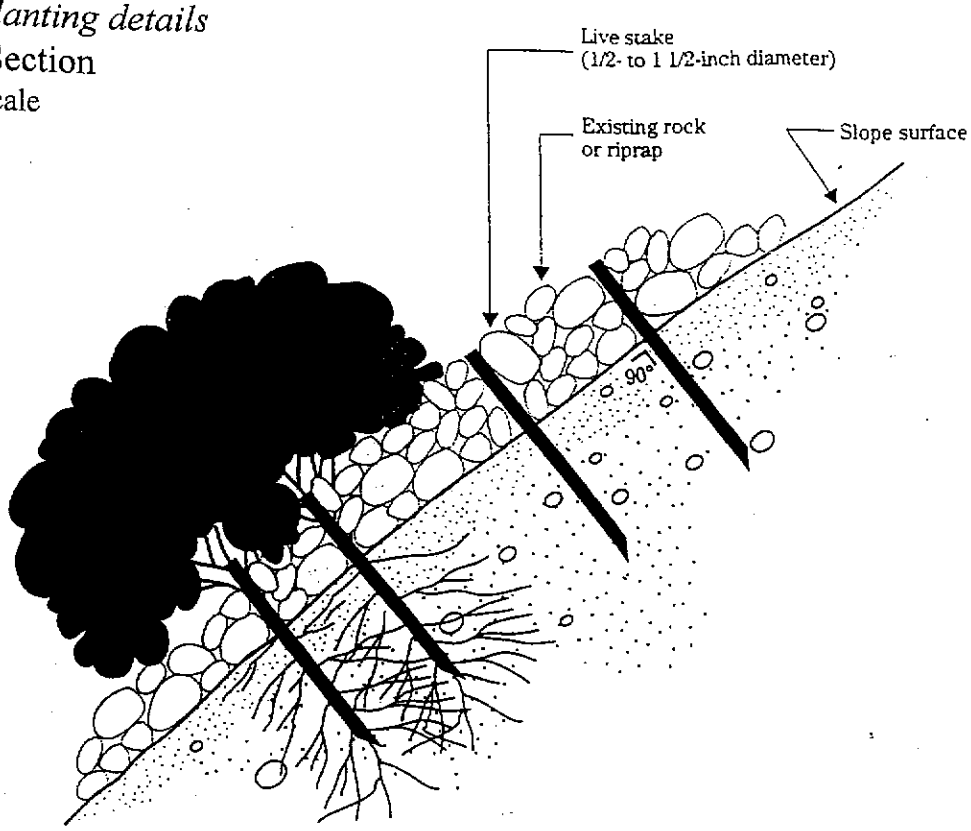
Typical Streambank Protection

USDA - NRCS

Joint planting details

Cross Section

Not to scale

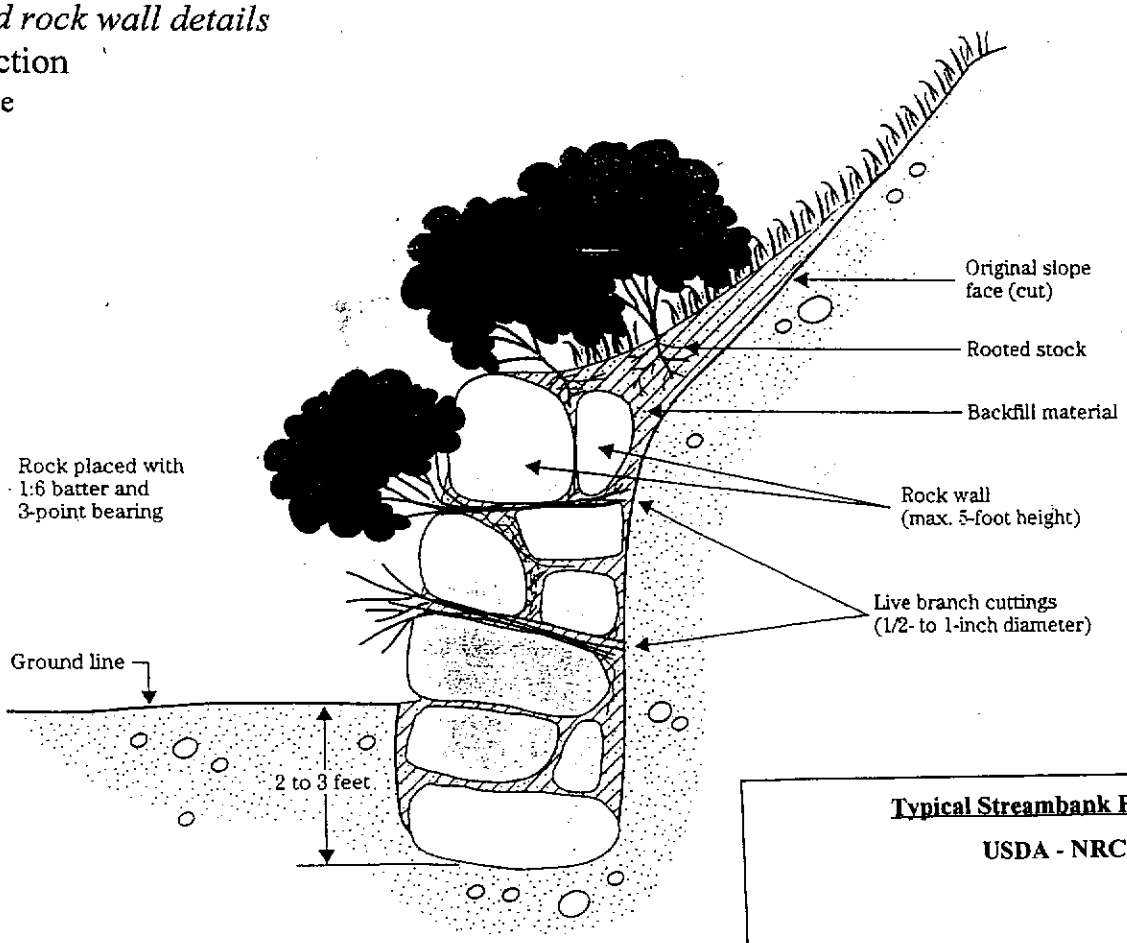


Note:
Rooted/leafed condition of the living plant material is not representative of the time of installation.

Vegetated rock wall details

Cross Section

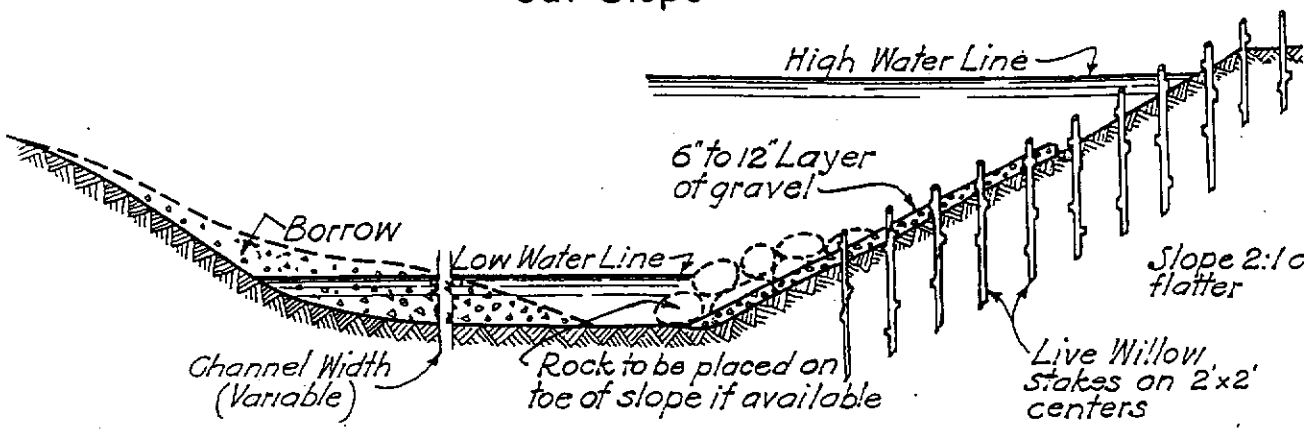
Not to scale



Typical Streambank Protection

USDA - NRCS

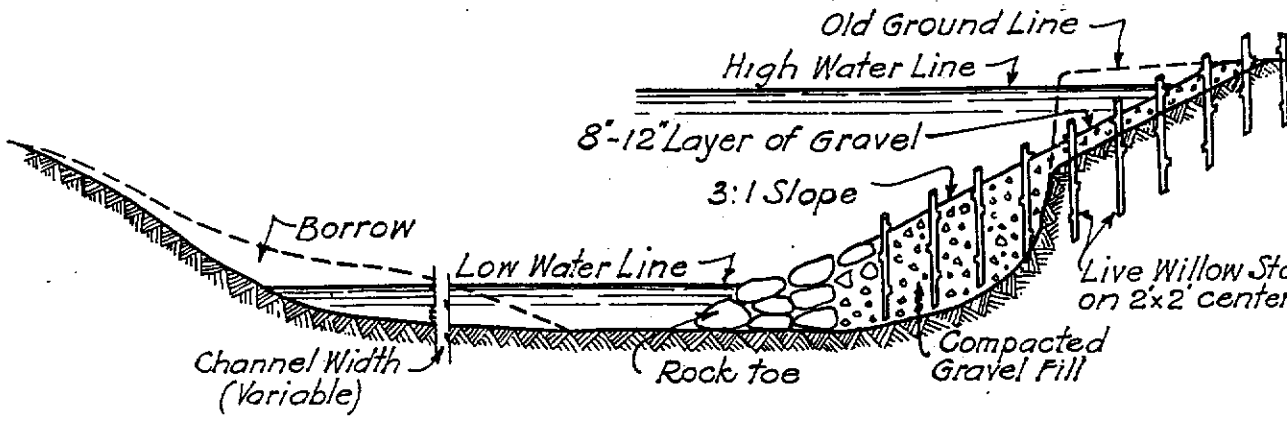
WILLOW-GRAVEL BANK PROTECTION
Cut Slope



X-SECTION OF CHANNEL

WILLOW-GRAVEL BANK PROTECTION
Filled Slope

Note:- All gravel fill is susceptible to erosion in high velocity streams.



X-SECTION OF CHANNEL

Typical Streambank Protection

USDA - NRCS

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

CHANNEL STABILIZATION
(Feet)
CODE 584

DEFINITION

Measure(s) used to stabilize the bed or bottom of a channel

PURPOSE

This practice may be applied as part of a conservation management system to support one or more of the following:

- Maintain or alter channel bed elevation or gradient
- Modify sediment transport or deposition
- Manage surface water and ground water levels in floodplains, riparian areas, and wetlands.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to the beds of existing or newly constructed channels, alluvial or non-alluvial, undergoing damaging aggradation or degradation that cannot be feasibly controlled by clearing or snagging, by the establishment of vegetative protection, by the installation of bank protection, or by the installation of upstream water control measures.

CRITERIA

It is recognized that channels may aggrade or degrade during a given storm or over short periods. A channel is considered stable if over long periods the channel bottom remains essentially at the same elevation.

Measures shall be designed and installed according to a site-specific plan.

Measures to be applied shall be compatible with improvements planned or being carried out by others.

Sufficient depth shall be maintained to provide adequate outlets for subsurface drains, tributary streams or ditches, or other channels.

Effect of channel work on existing structures such as culverts, bridges, buried cables, pipelines, and irrigation flumes shall be evaluated to determine impact on their intended functions.

Measures shall be designed for flow duration, depth of inundation, buoyancy, uplift, scour, angle of attack, and stream velocity.

Measures shall be compatible with the bank or shoreline materials, water chemistry, channel hydraulics, and slope characteristics, both above and below the water line.

Measures shall be designed for anticipated ice action, debris impact and fluctuating water levels.

Spoil material from clearing, grubbing, and channel excavation shall be disposed of in a manner that will not interfere with the function of the channel and in accordance with all local, state, and federal laws and regulations.

All disturbed areas around measures shall be protected from erosion. Vegetation shall be selected that is best suited for the anticipated site conditions.

Measures applied shall seek to avoid adverse effects to endangered, threatened, and candidate species and their habitats, whenever possible.

Measures installed to stabilize stream channels shall also be designed and installed to meet NRCS standards for the particular structure and type of construction.

Channel clearing to remove stumps, fallen trees, debris, and bars shall only be done when they are causing or could cause detrimental bank erosion or structural failure. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.

Measures shall be designed to maintain the appropriate sediment transport regime in order to

avoid detrimental erosion or sedimentation upstream and downstream.

Measures shall not impair the floodplain function.

Measures shall not result in adverse affects on the function of the stream or the stream corridor.

When water surface elevations are a concern, the effects of protective measures shall not cause detrimental changes in water surface elevations.

The quantity and character of the sediments entering the reach of channel under consideration shall be analyzed on the basis of both present conditions and projected conditions caused by changes in land use or land treatment and upstream improvements or structural measures.

CONSIDERATIONS

Consider area-wide planning for proper design, function and management of protective measures where the design reach involves by multiple stakeholders.

An assessment of channel stabilization needs should be considered in sufficient detail to identify the causes contributing to the instability (e.g. watershed alterations resulting in significant modifications of discharge or sediment production). Due to the complexity of such an assessment, use of an interdisciplinary team should be considered.

When designing protective measures, consider the changes that may occur in the watershed hydrology and sedimentation over the design life of the measure.

Consider utilizing woody debris removed during construction in the overall practice design.

Measures should consider habitat and migration needs of aquatic species.

Consider maintaining or improving the habitat value for fish and wildlife, which includes lowering or moderating water temperature, and improving water quality.

Consider opportunities to improve habitat for threatened, endangered, and other species of concern, where applicable.

Consider maximizing adjacent wetland functions and values with the project design and minimizing adverse effects to existing wetland functions and values.

Consider protecting side channel inlets and outlets from erosion or sedimentation.

Consider the type of human use and the social and safety aspects when designing the protective measures. Use construction materials, grading practices, vegetation, and other site development elements that enhance aesthetics, recreational use, and maintain or complement existing landscape uses such as pedestrian paths, climate controls, and buffers. Avoid excessive disturbance and compaction of the site during installation.

Measures should be designed to minimize safety hazards to boaters, swimmers, or people using the channel.

Cultural Resources Considerations

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern, or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates that the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with

the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

1. Stage-discharge and flow velocity relative to the water budget components, geologic materials comprising the stream channel, and objectives of the channel modification.

2. Effects on water tables, soil moisture storage, and rooting depths and transpiration of vegetation.

Water Quality

1. Temporary and long-term effects on erosion and sedimentation.

2. Changes in stream water temperature that may result from the clearing of vegetation or alteration of water sources to the channel.

3. Effects on the visual quality of the water resource.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for specific channel reaches and field sites and shall describe the requirements for applying the practice to achieve its intended purpose(s).

OPERATION AND MAINTENANCE

The owner or others responsible for operating and maintaining the system shall prepare an operation and maintenance plan. The plan shall provide specific instructions for operating and maintaining the system to insure that it functions properly. It shall also provide for periodic inspections and prompt repair or replacement of damaged components.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

CHANNEL STABILIZATION
(Feet)
CODE 584

DEFINITION

Measure(s) used to stabilize the bed or bottom of a channel

PURPOSE

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CRITERIA

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Measures shall be designed and installed according to a site-specific plan.

Measures to be applied shall be compatible with improvements planned or being carried out by others.

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PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for specific channel reaches and field sites and shall describe the requirements for applying the practice to achieve its intended purpose(s).

OPERATION AND MAINTENANCE

The owner or others responsible for operating and maintaining the system shall prepare an operation and maintenance plan. The plan shall provide specific instructions for operating and maintaining the system to insure that it functions properly. It shall also provide for periodic inspections and prompt repair or replacement of damaged components.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

584 - CHANNEL STABILIZATION

I. SCOPE

The work shall consist of furnishing materials and constructing stream stabilization measures to the lines, grades and elevations as shown on the drawings, or as staked in the field.

II. SITE PREPARATION

The area specified shall be cleared of trees, stumps, roots, brush, boulders, and debris. Removal of this material shall be done in such a manner as to avoid damage to other trees and property.

All material removed shall be piled in designated areas, and disposed of in such a manner as to have the least detrimental effect on the environment.

Clearing and disposal methods shall be in accordance with state and county laws with due regard to the safety of persons and property.

III. EXCAVATION

Excavation under this specification shall be limited to minor channel excavation and shaping as shown on the drawings or as staked in the field.

Excavation material shall be disposed of as shown on the drawing or as staked in the field.

All finished surfaces shall be generally smooth and pleasing in appearance.

IV. EARTHFILL PLACEMENT

Material

All fill material shall be obtained from approved borrow pits and from excavations (if suitable) required for other parts of the work. Fill materials shall contain no sod, brush, roots, or other perishable or unsuitable materials. Cobbles and rock fragment having maximum dimension of more than six inches shall be removed from the materials prior to compaction, and be disposed of or placed in areas designated by the Engineer.

Placement

The placing and spreading of fill material shall be started at the lowest point of the foundation and the fill brought up in horizontal layers of such thickness that the required compaction can be obtained. The fill shall be constructed in continuous horizontal layers except where openings or sectionalized fills are required. In those cases, the slope of the bonding surfaced between the embankment in place and the embankment to be placed shall not be steeper than 3 horizontal to 1 vertical. The bonding surface shall be treated the same as that specified for the foundation so as to insure a good bond with the new fill.

The distribution and gradation of materials shall be such that there are no lenses, pockets, streaks, or layers of material. If it is necessary to use materials of varying texture and gradation, the more impervious material shall be placed in the center and outer parts of the fill. If zoned fills of substantially differing materials are specified, the zones shall be placed according to lines and grades shown on the drawings.

Selected backfill material shall be placed around structures, pipe conduits, and anti-seep collars at about the same rate on all sides to prevent damage from unequal loading.

Fill placed around structures will be brought up at approximately uniform height on all sides of the structure.

Moisture content of the fill material shall be adequate for obtaining the required compaction. Material that is too wet shall be dried to meet this requirement, or removed, and material that is too dry shall have water added and mixed until the requirement is met.

The proper moisture content for compaction will be determined by inspection during the placement operation. The material should maintain a ball shape when squeezed in the hand. When specified, the moisture shall be maintained within 2 percentage points of optimum as determined by ASTM D-698.

As far as practicable, the material shall be brought to the proper water content in the borrow pits before excavation. Supplemental water, when required, may be applied by sprinkling the materials on the fill. Uniform distribution of the moisture shall be obtaining by discing, blading or other approved method prior to compaction.

Compaction

Construction equipment shall be operated over each layer of fill to insure that the required compaction is obtained. Special equipment shall be used if needed to obtain the required compaction.

Compaction shall meet the requirements of the method specified in the Practice Requirements and as described below:

A. Sheepsfoot roller - the maximum layer thickness shall be 8 inches before compaction. The roller shall have staggered, uniformly spaced tamping feet and be equipped with suitable cleaners. The weight of the roller shall not be less than 2,500 pounds per foot of width. The maximum speed of the compaction equipment shall be 3 miles per hour. The entire surface of each layer placed should receive 6 passes of this equipment to attain the necessary compaction.

B. Pneumatically tired equipment - The maximum layer thickness before compaction shall be 6 inches. A loaded scraper may be considered a pneumatic roller. The wheels of this equipment must pass over 90 percent of the surface of each lift before a new lift is placed.

C. Track laying equipment (bulldozer) - The maximum layer thickness before compaction shall be 4 inches. The tracks of the equipment must pass over 90 percent of the surface of each lift before a new lift is placed.

D. Compaction shall result in densities equal to or greater than 95 percent of the maximum obtained by laboratory compaction at optimum moisture of like soils in accordance with the procedure given to ASTM D-698, Procedure A.

E. Compaction shall result in densities equal to or greater than 90 percent of the maximum obtained by laboratory compaction at optimum moisture of like soils in accordance with the procedure given in ASTM D-1557, Procedure A.

Heavy compaction equipment shall not be operated within 2 feet of any structure. Hand directed tampers or compactors shall be used on areas not accessible to heavy compaction equipment, and within 2 feet of any structure. Fills compacted in this manner shall be placed in layers not greater than 4 inches in thickness before compaction, and shall meet the same density requirement as for the adjacent area.

Compliance with compaction requirements will be determined by the procedure given in ASTM D-1556 or D-2167 for methods D and E and by observation of performance for methods A, B, and C.

Fill not meeting the specified requirements shall be reworked or removed and replaced with acceptable fill.

Fill adjacent to structures, pipe conduits, and anti-seep collars shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping or manually directed power tampers or plate vibrators.

The passage of heavy equipment will not be allowed (1) over cast-in-place conduits prior to seven days after placement of the concrete, or (2) over any type of conduit until the compacted backfill has been placed over the top surface of the structure equal to one-half the clear span width of the structure of pipe, or two feet whichever is greater.

Compaction of backfill adjacent to structures shall not be started until after the expiration of the following minimum time interval after placement of the concrete:

Walls and counterforts	10 days
Anti-seep collars, conduits and cantilever outlet bents	3 days

V. STRUCTURES

All structures within the reach being stabilized, shall be constructed to conform with the reference specifications listed on the Practice Requirements sheet and the drawings.

VI. VEGETATIVE REQUIREMENTS

Unless otherwise specified, a protective cover of vegetation shall be established on all exposed surfaces on the channel banks as indicated on the drawings and shall conform to the requirements of Practice Specification 342, Critical Area Planting. Planted areas shall be fenced where necessary to protect the vegetation until it is established.

VII. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

VIII. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained stable stream channel is an asset to your farm. This stable stream channel was designed and installed to stabilize an eroding channel. The estimated life span of this system is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. periodic mowing may also be needed to control height.

If fences are installed, they shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Control livestock access and use of unfenced areas.

Remove all foreign debris as quickly as possible.

Periodic removal of all silt, sand, or gravel deposits.

Repair and revegetate all eroded channel sections.

Eradicate or otherwise remove all rodents or burrowing animals as their burrows may weaken earthen sections and develop flow paths for water and accelerate soil erosion or failure. Immediately repair any damage caused by their activity.

Immediately repair any vandalism, vehicular, or livestock damage.

Other items specific to you project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

STRUCTURE FOR WATER CONTROL

(No.)
CODE 587

DEFINITION

A structure in an irrigation, drainage, or other water management systems that conveys water, controls the direction or rate of flow, or maintains a desired water surface elevation.

Scope

This standard applies to the structures normally installed in a well-planned irrigation or drainage system, wildlife facility or other water management systems for the conveyance, flow control, or level regulation of water. It covers the planning and functional design of such water-control structures but not the detailed design criteria or construction specifications for specific structures. It does not apply to structural components of irrigation pipelines or to subsurface drains or grade-stabilization structures (410).

PURPOSES

To control the stage, discharge, distribution, delivery, or direction of flow of water in open channels or water use areas. Also used for water quality control, such as sediment reduction or temperature regulation. These structures are also used to protect fish and wildlife and other natural resources.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies wherever a permanent structure is needed as an integral part of irrigation, drainage, or other water-control systems to serve one or more of the following functions:

1. To conduct water from one elevation to a lower elevation within, to, or, from a ditch, channel, or canal. Typical structures: drops, chutes, turnouts, surface water inlets, head gates, pump boxes, and stilling basins.

2. To control the elevation of water in drainage or irrigation ditches. Typical structure: checks.

3. To control the division or measurement of irrigation water. Typical structures: division boxes and water measurement devices.

4. To keep trash, debris, or weed seeds from entering pipelines. Typical structure: debris screens, fish screens.

5. To control the direction of channel flow resulting from tides and high water or backflow from flooding. Typical structure: tide and drainage gates.

6. To control the level of a water table or to remove surface or subsurface water from adjoining land, to flood land for frost protection or to manage water levels for wildlife or recreation. Typical structures: water level control structures, pipe drop inlets, and box inlets.

7. To provide water control for recreation or similar purposes.

8. To convey water over, under, or along a ditch, canal, road, railroad, or other barriers. Typical structures: bridges, culverts, flumes, inverted siphons.

9. To modify water flow to provide habitat for fish, wildlife, and other aquatic animals. Typical structures: deflectors, chutes, cold water release, or structures to make pools and riffles.

CRITERIA

Structures shall be designed on an individual job basis, or applicable NRCS standard drawings shall be adapted, to meet site conditions and functional requirements. They shall be part of an approved and overall engineering plan for irrigation, drainage, wildlife, recreation, channel improvement, or similar purposes.

The plan shall specify the location, grades, dimensions, materials, and hydraulic and structural requirements for the individual structure. Provisions must be made for

necessary maintenance. Care must be used to insure that the area's visual resources are not damaged. If watercourse fisheries are important, special precautions or design features may be needed to insure continuation of fish migrations.

If soil and climatic conditions permit, a protective cover of vegetation shall be established on all disturbed earth surfaces. If soil or climatic conditions preclude the use of vegetation and protection is needed, non-vegetative means, such as mulches or gravel, may be used. In some places, temporary vegetation may be used until permanent vegetation can be established. The structure can be fenced, if necessary, to protect the vegetation. Seedbed preparation, weeding, fertilizing, and mulching shall comply with the instructions in technical guides.

Additional Criteria for Fish Screens

Fish screens shall be designed on an individual job basis to meet site conditions and functional requirements. Fish screen designs must meet the requirements of the current version of the State of California, Fish Screening Criteria and the National Marine Fisheries Service, Southwest Region, Fish Screening Criteria for Anadromous Salmonids.

Provisions of gravity flow fish screens will include return of the fish to the point of diversion in a manner which insures their survival. Provisions for fish trapping need to be considered and incorporated into the design if necessary.

Fish screens should be designed for easy removal from the river for Operations and Maintenance. Fish screen designs should also incorporate pump safety shutoff mechanism, or bypass, with instrumentation to determine the status of the system. Water backwash systems should incorporate appropriate water filtration devices.

CONSIDERATIONS

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Potential for a change in the rate of plant growth and transpiration because of changes in the volume of soil water.

3. Effects on downstream flows or aquifers that would affect other water uses or users.

4. Effects on the volume of downstream flow that might cause environmental, social or economic effects.

5. The effect on the water table of the field to ensure that it will provide a suitable rooting depth for the anticipated crop.

6. Potential use for irrigation management to conserve water.

Water Quality

1. Effects on erosion and the movement of sediment and soluble and sediment-attached substances carried by runoff.

2. Effects on the movement of dissolved substances below the root zone and to ground water.

3. Short term and construction-related effects of this practice on the quality of downstream water.

4. Effects of water level control on the temperatures of downstream waters for their effects on aquatic and wildlife communities.

5. Effects on wetlands or water-related wildlife habitats.

6. Effects on the visual quality of downstream water resources.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service,

National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

PLANS AND SPECIFICATIONS

Plans and specifications for installing structures for water control shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan must be prepared by the Designer for use by the owner or other responsible for operating this practice. The plan should provide specific instructions for operating and maintaining the system to insure that it functions properly. It should also provide for periodic inspections and prompt repair or replacement of damage components.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

587A - STRUCTURE FOR WATER CONTROL CORRUGATED METAL PIPE

I. SCOPE

The work will consist of furnishing and placing of circular, arched or elliptical corrugated metal pipe and the necessary fittings to the lines, grades, and elevations as shown on the drawings.

II. MATERIALS

Pipe and fittings shall be of the size, shape, and kind of material shown on the drawings. Zinc-coated iron or steel corrugated pipe and fittings and coatings shall conform to the requirements of ASTM Specification A-760 for the specified classes and shapes of pipe. Aluminum corrugated pipe and fittings and coatings shall conform to the requirements of Federal Specification WW-P-402 or ASTM B-745 for the specified classes and shapes of pipe.

III. EXCAVATION

Excavation for the conduit shall conform to the lines and grades shown on the drawings or as staked in the field, and as necessary for safe installation.

IV. INSTALLATION

The pipe shall be installed in accordance with the manufacturer's recommendations unless otherwise specified. Field welding of corrugated galvanized iron or steel pipe will not be permitted. The pipe sections shall be joined with standard coupling bands unless otherwise specified. The pipe shall be firmly and uniformly bedded throughout its entire length. Backfill shall be accomplished in a manner that will not displace the pipe from the design grade or elevations shown on the drawings. Damaged coatings shall be repaired by acceptable methods.

V. WATER CONTROL GATES

Water control gates, when required, shall conform to the details shown on the drawings and shall be installed according to the manufacturer's recommendation.

VI. BACKFILL

Backfill material shall contain no rocks greater than 2 inches. Compaction shall be accomplished by means of hand tamping or manually directed power tamper, or plate vibrators. Fill shall be placed in approximately horizontal layers. Fill shall be placed in layers not more than 4 inches thick before compaction, and in a manner which will prevent damage to the conduit. The height of the fill adjacent to the conduit shall be increased at approximately the same rate on all sides. Water shall be added to the fill material, if necessary, to obtain the proper moisture for compaction; the material shall retain a ball shape when squeezed in the hand.

VII. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

VIII. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

IX. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained structure for water control is an asset to your farm. This structure was designed and installed to safely convey water at a condition that will prevent erosion. The estimated life span of this system is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Here are some recommendations to help you develop a good operations and maintenance program.

All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Remove any debris that may accumulate on or in the immediate area of the structure.

Make sure that all structural drains are functional.

Settlement or cracks in the soil weaken earthen sections and may accelerate the development of flow paths which may result in structure failure. This should be investigated to deter mine the cause and immediately repaired.

Check concrete surfaces for accelerated weathering, spalling, settlement, alignment or cracks.

Check metal surfaces for rust and other damage, especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as protective covering.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Immediately repair any vandalism, vehicular, or livestock damage to the structure, and any appurtenances.

Other items specific to your project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

587C - STRUCTURE FOR WATER CONTROL FISH SCREEN

I. SCOPE

The work will consist of furnishing and installing a fish screening system to prevent fish, trash and debris from entering the irrigation delivery system. The work will include all the necessary work and fittings installed to the lines, grades and elevations as shown on the drawings.

II. MATERIALS

Pipe and fittings shall conform to the Practice Standard 430 appropriate to the pipe material.

Concrete used in the installation shall conform to the NRCS Construction Specification 701 Concrete.

Earthfill shall conform to the NRCS Construction Specification 703. Earthfill.

Rock riprap shall conform to the NRCS Construction Specification 707. Rock Riprap.

Grouted Rock Riprap shall conform to NRCS Construction Specification 708 Rock Riprap (Grouted).

Geotextile Fabrics shall conform to NRCS Construction Specification 705 Geotextile Fabric.

III. EXCAVATION

Excavation for the installation shall conform to the lines and grades shown on the drawings or as staked in the field, and as necessary for safe installation.

IV. INSTALLATION

Pumped diversions, which are screened using manufactured, self-contained screens, shall be installed in accordance with the manufacturer's recommendations unless otherwise specified. Minimum clearance of one screen diameter from the channel invert and minimum submergence of one screen diameter from the water surface is required. Installation of all other screens shall be as shown on the drawings.

Pipe shall be shop or field fabricated as needed. Field welding of galvanized corrugated metal pipe will not be permitted. Pipe section shall be joined with flanged fittings or coupling bands unless otherwise specified. Pipe shall be bedded or supported as shown on the drawings.

V. WATER CONTROL GATES

Water control gates, when required, shall conform to the details shown on the drawings and shall be installed according to the manufacturer's recommendation.

VI. BACKFILL

Backfill material shall contain no rocks greater than 2 inches. Compaction shall be accomplished by means of hand tamping or manually directed power tamper, or plate vibrators. Fill shall be placed in approximately horizontal layers. Fill shall be placed in layers not more than 4 inches thick before compaction, and in a manner which will prevent damage to the conduit. The height of the fill adjacent to the conduit shall be increased at approximately the same rate on all sides. Water shall be added to the fill material, if necessary, to obtain the proper moisture for compaction; the material shall retain a ball shape when squeezed in the hand.

VII. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

VIII. SPECIAL MEASURES

Measures and construction methods shall be incorporated, as needed and practical, that enhance fish and wildlife values while minimizing disturbances to instream and riparian habitats. Special attention shall be given to protecting visual resources as well as the physical characteristics of the streambank, streambed and surrounding vegetation.

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IX. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained fish screen is an asset to your farm. This structure was designed and installed to safely convey water in a manner that will prevent entraining anadromous fish in your irrigation system. Lack of attention to operation and maintenance details has the potential to kill significant numbers of fish that the screen has been designed to protect.

The estimated life span of this system is at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. Here are some recommendations to help you develop a good operations and maintenance program.

Pumped diversions:

Before start of irrigation season, remove, clean and inspect screens for damage, corrosion, and service rotating components as recommended by the manufacturer. Repair or replace damaged screens or hardware components.

Inspect backwash pump system and pressure gauge for proper operation. Pressure shall be within the specified pressure range. Spray nozzles shall be inspected for plugging or debris and replaced if excessive wear is noted. Check to see that the interlock with the main pumping plant is functional so that the backwash pump cannot be inadvertently turned off.

Remove any debris and silt bars that may have accumulated and check depth of water below screen to assure one screen diameter clearance from the bottom.

Remove any aquatic weeds that may interfere with rotation of screens or cause debris to accumulate.

Install and maintain fish screen warning signs to notify boaters and fisherman of submerged obstacle.

Inspect all working platforms, fences and railings for safety and post warning signs to prevent unauthorized entry.

During pump operation monitor backwash pressure or install automatic pump safety shutoff switch.

If variations in irrigation pump supply or debris accumulation on screen are noted, discontinue pumping. Do not resume pumping until the difficulty has been located and corrected.

Non-pumped Diversions:

The screen should be visited as frequently as environmental conditions dictate. If the river level or diversion flow changes, steps must be taken to ensure that the screen is properly submerged for the amount of flow being diverted. Bypass flows may also need to be adjusted.

Dealing with debris at a screen site needs to be addressed on a frequent basis as debris accumulation can cause significant injury to fish. Debris type and quantity vary seasonally so a suitable schedule should be developed.

Remove any debris that may accumulate on or in the immediate area of the structure. Remove debris from bypass downwells, bypass entrances and exits, trash racks and along the screen face.

Components must be greased (with environmentally benign grease) on a regular basis. Screen seals must be checked frequently for wear and replaced as needed. Sediment should be removed before it starts passing through the seals.

All screens:

All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also

be needed to control height.

Compacted earthfill shall be inspected for destructive rodent holes, and repaired as necessary.

Make sure that all structural drains are functional.

Settlement or cracks in the soil weaken earthen sections and may accelerate the development of flow paths that may result in structure failure. This should be investigated to determine the cause and immediately repaired.

Check concrete surfaces for accelerated weathering, spelling, settlement, alignment or cracks.

Check metal surfaces for rust and other damage, especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as protective covering.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Immediately repair any vandalism, 'vehicular, or livestock damage to the structure, and any appurtenances.

Other items specific to your project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

UNDERGROUND OUTLET
(Feet)
CODE 620

DEFINITION

A conduit installed beneath the surface of the ground to collect surface water and convey it to a suitable outlet.

PURPOSES

Dispose of excess water from terraces, diversions, subsurface drains, surface drains, trickle tubes or principal spillways from dams (outside the dam area only), or other concentrations without causing damage by erosion or flooding.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where: (1) excess surface water needs to be disposed of; (2) a buried outlet is needed for Diversions (362), Terraces (600), or similar practices; (3) an underground outlet can be installed that will safely dispose of excess water; and (4) surface outlets are impractical because of stability problems, climatic conditions, land use, or equipment traffic.

CRITERIA

Capacity - The underground outlet shall be designed, alone or in combination with other practices, with adequate capacity to insure that the terrace, diversion, or other practices function according to the standard for the specific practice. For example, an underground outlet can be used in combination with a grassed waterway or a surface drain to carry part of the design flow. The capacity of the underground outlet for natural or constructed basins shall be adequate for the intended purpose without causing excessive damage to crops, vegetation, or improvements.

Inlet - An inlet can be a collection box, a perforated riser, or other appropriate device. Its capacity shall be adequate to provide the maximum design flow in the conduit. Flow-control devices shall be installed as necessary. Perforated risers must be of durable material, structurally sound, and resistant to damage by rodents or other animals. If burning of vegetation is likely to create a fire hazard, the inlet shall be fire resistant. Blind inlets can be used where they are effective. Collection boxes must be large enough to facilitate maintenance and cleaning operations. The inlet must have an appropriate trash guard to insure that trash or other debris entering the inlet passes through the conduit without plugging. It must also have an animal guard to prevent the entry of rodents or other animals.

Pressure-relief wells shall be designed and installed as needed to control pressure. If junction boxes and other structures are needed, they shall be designed and installed in a manner that facilitates cleaning and other maintenance activities.

Hydraulics - Underground outlets shall be continuous conduits, tubing, or tile. Joints shall be hydraulically smooth, and the materials and methods used shall be recommended by the manufacturer. If a pressure system is used, joints shall be adequate to withstand the design pressure, including surges and vacuum. The maximum velocity must not exceed the safe velocity for the conduit materials and installation.

Lines shall be adequate to carry the design flow when the outlet and all inlets are operating at design capacity. Positive grade shall be maintained in all sections of an underground outlet. Capacity shall be based on the pipe size or on other flow control devices to prevent water from the upper inlets from discharging through the lower inlets. The minimum conduit diameter shall be 3 inches.

Materials - Materials shall meet or exceed the design requirements against leakage and shall withstand internal pressure or vacuum and external loading. Plastic, concrete, aluminum, and steel shall meet the requirements specified in the applicable ASTM standard Conduits, however, can be perforated or nonperforated, depending on the design requirements. A filter fabric wrap (sock) or equivalent shall be used if migration of soil particles around conduit is anticipated. All exposed

plastic materials shall be protected from degradation due to exposure to sunlight.

Quality of Pipe - The pipe shall conform to or exceed the requirements of the appropriate specification listed below:

ASTM Specifications:

A 760 Corrugated Steel Pipe, Metallic Coated for Sewer and Drains
B 745 Corrugated Aluminum Pipe for Sewers and Drains
C 700 Vitrified Clay Pipe, Extra Strength, and Perforated
C 412 Concrete Drain Tile
C 118 Concrete Pipe for Irrigation or Drainage
C 497 Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile
C 14 Concrete Sewer, Storm Drain, and Culvert Pipe
C 76 Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
D 2729 Poly(vinyl Chloride) (PVC) Sewer Pipe and Fittings
D 1527 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80
D 1785 Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
D 2104 Polyethylene (PE) Plastic Pipe, Schedule 40
D 2239 Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
D 2241 Poly(Vinyl Chloride) (PVC), Pressure-Rated Pipe (SDR Series)
D 2282 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)
D 2447 Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter
D 2513 Thermoplastic Gas Pressure Pipe, Tubing and Fittings
D 2737 Polyethylene (PE) Plastic Tubing
D 2672 Joints for IPS PVC Using Solvent Cement
D 3035 Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
F 405 Corrugated Polyethylene (PE) Tubing and Fittings
F 667 Large Diameter Corrugated Polyethylene Pipe and Fittings
AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 12 inches
AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing, ½ inch through 3 inches

CLAY PIPE

These specifications may be modified as follows:

Where clay pipe will not be subject to freezing and thawing hazards, before or during installation, and where the average frost depth is less than 18 inches, the freezing and thawing and absorption tests may be modified or waived.

Outlet - The outlet shall be sufficiently stable for all anticipated flow conditions. It shall be designed for the maximum anticipated water surface at design flow. A continuous section of closed conduit or a headwall can be used at the outlet. If a closed conduit is used, it shall be durable and strong enough to withstand all anticipated loads, including those caused by ice. Outlets shall not be placed in areas of active erosion. If fire is a hazard, the outlet shall be fire resistant. All outlets must have animal guards to prevent the entry of rodents or other animals. Animal guards must be hinged to allow passage of debris.

Anti-seep Collars - Consideration must be given to prevent piping in the backfill along the pipeline. Failure of the system can result if this is not considered. Piping is controlled at many sites by sloping of the trench banks and compacting the backfill (see figure 8-78, page 8-83 of the Engineering Field Manual). Moisture content of the backfill should be adjusted to aid compaction. Highly angular material which may bridge should not be used for backfill where piping is a concern. Protection can be provided by the use of anti-seep collars to increase the path of percolation.

Sufficient anti-seep collars shall be installed on an underground outlet to prevent the surface and subsurface waters from flowing into and adjacent to the pipe. Particular locations of weakness are below inlets, bends, transitions and areas where compaction is difficult. They should be placed on a maximum spacing of 100 feet.

Anti-seep collars of concrete, sheet metal, or rubber can be used. The collars are to extend beyond the pipe on all sides at least 1 foot or the diameter of the pipe whichever is greater.

Compaction around the anti-seep collars must be equal to or greater than the adjacent in-place material.

Protection - All disturbed areas shall be reshaped and regraded so that they blend with the surrounding land features and conditions. Visual resources must be given the same consideration as other design features. Areas that are not to be farmed or covered by structural works shall be established to vegetation or otherwise protected from erosion as soon as practicable after construction.

CONSIDERATIONS

Consider effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

Consider effects on the volume of downstream flow that might cause undesirable environmental, social, or economic effects.

Evaluate potential use for water management.

Consider effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances that would be carried by runoff.

Consider effects on the visual quality of downstream water resources.

Consider the construction-related effects on the quality of downstream watercourses.

Consider effects on wetlands or water-related wildlife habitats.

Evaluate potential impact on water quality due to agri-chemicals in outflow.

Consider depth of underground outlet in regard to tillage equipment depth and maintenance, if applicable.

Cultural Resources Considerations

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern, or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates that the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation and ground water recharge;

2. Effects on the volume of downstream flow might cause undesirable environmental, social or economic effects;

3. Potential use for water management.

Water Quality

1. Consider effects on erosion and the movement of sediment, pathogens, and soluble and sediment attached substances that would be carried by runoff.

2. Consider effects on the visual quality of downstream water resources.

3. Consider sediment-attached and construction related effects on the quality of downstream water courses.

4. Consider effects on wetlands or water related wildlife habitats.

PLANS AND SPECIFICATIONS

Plans and specifications for installing underground outlets shall be in keeping with this standard and shall describe the requirements for installing the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

Underground outlets shall be maintained by:

- Keeping inlets, trash guards, and collection boxes and structures clean and free of materials that can reduce the flow;
- Repairing leaks and broken or crushed lines to insure proper functioning of the conduit;
- Checking outlet conduit and animal guards to ensure proper functioning of the conduit;
- Keeping adequate backfill over the conduit;
- Repairing any eroded areas at the pipe outlet.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

620 - UNDERGROUND OUTLET

I. SCOPE

The work shall consist of furnishing materials and installing underground outlet with appurtenances to the lines, grades, and elevations as shown on the drawings or as staked in the field.

II. EXCAVATION

Excavation shall be to the lines and grades shown on the drawings. Where trenches are excavated in soils containing rock or other hard material, or soils subject to appreciable swelling and shrinking, or when the trench bottom is unstable, the trenches shall be overexcavated and backfilled with selected materials to sufficient depth to provide a suitable base. If water is in the trench, that water shall be removed before placement of the pipe.

The width of the trench at any point below the top of the pipe shall be no wider than is necessary to, join, and backfill the pipe, and in no event be more than 24 inches wider than the nominal diameter of the pipe.

III. PLACEMENT

No pipe shall be laid which is cracked, checked, spalled, or damaged beyond ASTM specification tolerances; and all such sections of pipe shall be permanently removed from the work site.

Before final positioning of the pipe for jointing, the bedding for the pipe shall be made by tamping the pipe firmly into the bedding and not be by wedging or blocking.

The interior of the pipe shall be kept free of dirt and other foreign material as pipe installation progress.

IV. BACKFILLING

Initial Backfill

Hand, mechanical, or water packing methods are optional.

The initial backfill material shall be selected soil or sand free from rocks or stones larger than one inch in diameter. At the time of placement, the moisture content of the material shall be such that the required degree of compaction can be obtained with the backfill method to be used. The initial backfill material shall be so placed that the pipe will not be displaced, excessively deformed, or damaged.

Hand or Mechanical Backfill

Compaction shall be accomplished by means of hand tamping or manually directed power tamper, or plate vibrators, or as approved by the technician. Fill shall be placed in approximately horizontal layers. Hand compacted fill shall be placed in layers not more than 4 inches thick before compaction. Fill shall be placed in a manner that will prevent damage to the conduit. The height of the fill adjacent to the conduit shall be increased at approximately the same rate on all sides. Water shall be added to the fill material to obtain the proper moisture for compaction as directed by the technician.

Water Packing

When water packing is used, the pipeline first shall be filled with water. The initial backfill, before wetting shall be of sufficient depth to insure complete coverage of the pipe after consolidation has taken place. Water packing is accomplished by adding water to diked reaches of the trench in such quantity as to thoroughly saturate the initial backfill without excessive pooling of water. After saturation, the pipeline shall remain full until after final backfill is made. The wetted fill shall be allowed to dry until firm before final backfill is begun.

Final Backfill

Final backfill material shall be free of large rocks, frozen clods and other debris greater than three inches in diameter. The material shall be placed and spread in approximately uniform layers in such a manner that there will be no unfilled spaces in the backfill and the backfill will be level with the natural ground or at the design grade required to provide the minimum depth of cover after settlement has taken place. Rolling equipment shall not be used to consolidate the final backfill until a minimum depth of cover of 2 feet has been placed.

All special backfill requirements of the pipe manufacturer shall be complied with during the backfill operations.

V. MATERIALS

Pipe

The pipe shall be of the size and conform to the requirements of the Specification listed on the "Practice Requirement" sheet.

Appurtenances

All appurtenances shall conform to the specifications listed on the "Practice Requirement" sheet and to the sizes and dimensions as shown on the drawings.

Appurtenances shall include, but not be limited to, anti-seep collars, outlets, and energy dissipators. Backfill adjacent to appurtenances is critical, and shall be manually directed and to the same density the adjacent undistributed earth.

VI. BASIS OF ACCEPTANCE

The acceptability of the pipeline shall be determined by inspections to insure compliance with all the provisions of this specification with respect to the design of the line, the pipe and pipe markings, the appurtenances, and the minimum installation requirements.

VII. VEGETATIVE COVER

Unless otherwise specified, a protective cover of vegetation shall be established on the disturbed area. The planting of vegetative materials shall conform to the requirements of Practice Specification 342, Critical Area Planting.

VIII. SPECIAL MEASURES

Measures and construction methods shall be incorporated as needed and practical that enhance fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food and den trees.

IX. CONSTRUCTION OPERATIONS

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized and held within legal limits. The owner, operator, Contractor or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

The completed job shall be workmanlike and present a good appearance.

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained underground outlet for water is an asset to your farm. This outlet was designed and installed to pressurize and convey water in a pipeline where it can be released without causing erosion. The estimated life span of this installation is at least 10 years. The life of the practice can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic maintenance and may also require operational items to maintain satisfactory performance. Here are some recommendations to help you develop a good operation and maintenance program.

Check all above ground connections, valves, gates, trash racks, rodent guards, inlets and outlets to make sure they are functioning properly.

Maintain design depth of cover on all pipelines and structures.

Avoid operation of tillage and subsoiling equipment that could damage any component of the system.

Remove all foreign debris that hinders system operation.

Limit traffic over pipeline to designated sections that were designed for traffic loads.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing may also be needed to control height.

Eradicate of otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Immediately repair any vandalism, vehicular or livestock damage.

Other items specific to your project are listed on the "Practice Requirement" sheet.

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

WATER AND SEDIMENT CONTROL BASIN
(No.)
CODE 638

DEFINITION

An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

PURPOSES

A water and sediment control basin may be established to:

- Improve farmability of sloping land;
- Reduce watercourse and gully erosion;
- Trap sediment;
- Reduce and manage onsite and downstream runoff;
- Improve downstream water quality.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to sites where:

1. The topography is generally irregular.

2. Watercourse or gully erosion is a problem.

3. Sheet and rill erosion is controlled by other conservation practices.

4. Runoff and sediment damage land and improvements.

5. Soil and site conditions are suitable.

6. Adequate outlets can be provided.

7. Effective height of the embankment is 6 feet or less. For effective heights greater than six feet, apply standard (378) Pond, (410) Grade Stabilization or TR-60 according to the class and type of structure.

Water and sediment control basins shall not be used in place of terraces. Where a ridge and/or channel extend beyond the detention basin or level embankment, standards for Terrace (600) or Diversion (362) must be applied as appropriate.

CRITERIA

General Criteria Applicable To All Purposes

This practice may be applied as part of a resource management system designed to achieve the conservation objectives. Other components of this resource management system shall be installed to reduce soil loss in the interval above and below the basin to prevent excessive maintenance and operation problems.

Where land ownership or physical conditions preclude treatment of the upper portion of a slope, a water and sediment control basin may be used to separate this area from, and permit treatment of the lower slope.

The design must limit inundation, infiltration, and seepage to prevent crop damage and/or other problems.

Laws and Regulations - This practice must conform to all Federal, State, and Local laws and regulations. Laws and regulations of particular concern include those involving water rights, dam construction, land use, pollution control, property easements, wetlands, preservation of cultural resources, and endangered species.

Spacing - Water and sediment control basins are sometimes constructed in series down minor watercourses or swales. Under these circumstances, adjust spacing or include other measures as needed to prevent erosion in the watercourse between basins. In the absence of site-specific information, refer to guidance set forth in NRCS Conservation Practice Standard (600), Terrace.

The system of basins and row arrangements shall be parallel where possible and spaced to accommodate farm widths and crop row spacing.

Spacing design must consider embankment slope lengths, top width, and outlet location.

Cross Section - For portions of the basin controlling only flowing water 3 feet or less deep, embankment slopes must be two horizontal to one vertical, or flatter. For all other portions of the basin, the sum of the upstream and downstream slopes must be 5:1 or flatter with a maximum of 2:1 in either slope. Slopes may be vegetated or flattened to permit cropping.

Earth Embankment - Constructed embankment height must be at least 5 percent greater than design height to allow for settlement. The maximum settled height of the embankment must be 6 feet or less measured from natural ground at centerline of the embankment. The minimum top width of embankments shall be 6 feet.

Foundation Cutoff and Seepage Control - Portions of basin ridges designed to impound more than a 3-foot depth of water must include foundation cutoff and seepage control as required by the standard for (378) Pond.

Capacity - Basins must have capacity to prevent overtopping by runoff from a 10-year frequency, 24-hour duration storm. For larger design storms, apply standard (378) Pond, (410) Grade Stabilization or TR-60 according to the class and type of structure.

In addition to the above storage, basins must have capacity to store at least the anticipated 10-year sediment accumulation, or periodic sediment removal must be provided to maintain the required capacity.

Basin ends must be closed to an elevation that will contain design capacity. Freeboard may be added to design height to provide for safe operation of auxiliary spillways. Auxiliary spillways must not contribute runoff to a lower basin (or pond) except where the lower basin (or pond) is designed to control the flow.

Outlets - Water and sediment control basins must have spillways, underground outlets or soil infiltration outlets that conform to Conservation Practice Standards:

- (378), Pond;
- (412) Grassed Waterway;
- (362) Diversion; or
- (620) Underground Outlet.

Topsoil - Where necessary to restore or maintain productivity, topsoil must be stockpiled and spread over disturbed areas.

Vegetation - Disturbed areas that are not cropped must be established to appropriate vegetation or otherwise protected from erosion using organic or gravel mulch or other measures.

Selection of vegetation species must consider environmental quantity and quality, endangered species needs, and wildlife food and habitat needs. Seedbed preparation, fertilizing, seeding, and mulching must be in accordance with standards for (342) Critical Area Planting and (484) Mulching.

CONSIDERATIONS

Water and sediment control basins should be part of a resource management plan including such practices as terraces, grassed waterways, contouring, a conservation cropping system, conservation tillage, and crop residue management.

Where possible, the basin should be configured to enhance sediment deposition. This can be accomplished by using flow deflectors, inlet and outlet selection, and by adjusting the length to width ratio.

For cropped fields, embankment orientation and crop row direction should be approximately perpendicular to the land slope to support contour farming. The design should support farmability by limiting short point rows or sharp curves. Field boundaries and row lengths should also be considered in planning basin location and row direction.

Operation safety of vehicle and farming equipment should be considered when selecting cut and fill slopes, especially where cropping or haying is planned.

Effects on streams and wetlands must be considered. Mitigation may be required where water is diverted or degraded for downstream uses.

This practice can be used to develop/enhance seasonally ponded areas for migratory waterfowl.

Where possible, the design should enhance habitat for native and endangered species. Effects on downstream water quality and temperature may be critical for some species.

Cultural Resources Considerations

NRCS' objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS' objective is to benefit these species and others of concern, or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates that the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and groundwater recharge;
2. Effects on downstream flows and aquifers that would affect other water uses and users;
3. Effects on volume of discharge flow on the environmental, social, and economic conditions;
4. Effects on the water table downstream and the results of changes of vegetative growth.

Water Quality

1. Effects on erosion, movement of sediment, pathogens, and soluble and sediment-attached substances that could be carried by runoff;
2. Effects on the visual quality of onsite and downstream water resources;
3. Effects of construction and early establishment of protective vegetation on the surface and ground water;
4. Effects on wetlands and water-related wildlife habitats.

PLANS AND SPECIFICATIONS

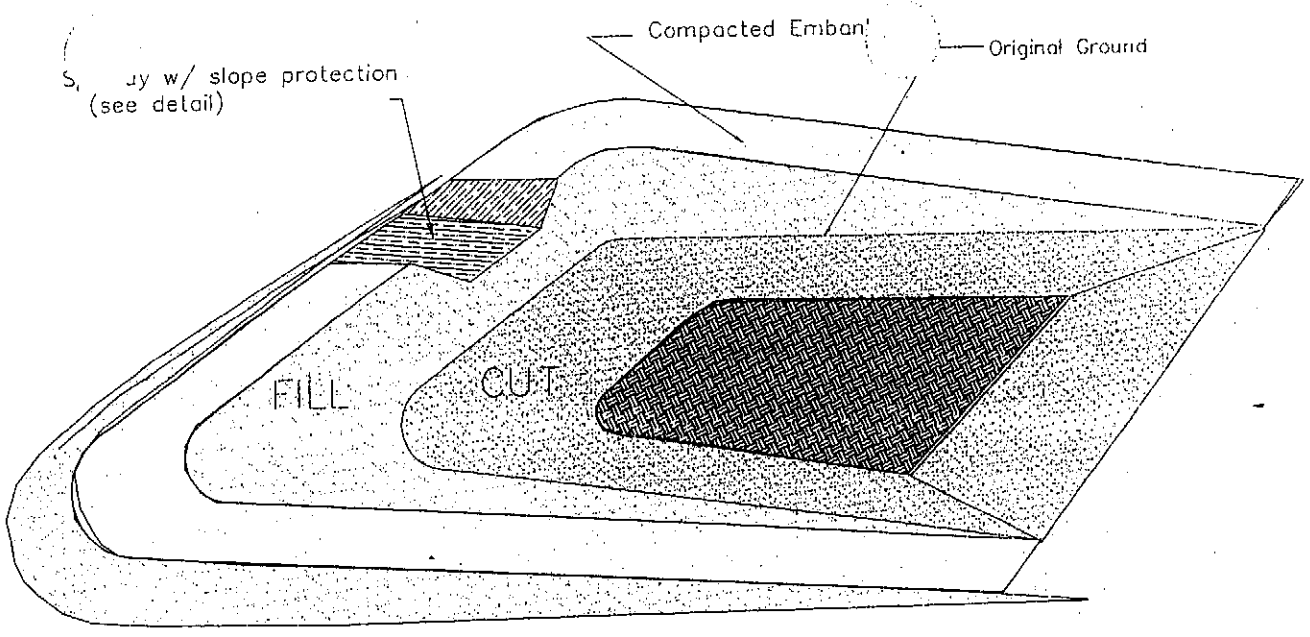
Plans and specifications for installing sediment and water control basins must conform to requirements of this standard and must describe requirements for applying the practice and achieving its intended purpose.

OPERATION AND MAINTENANCE

A site specific Operation and Maintenance (O&M) plan must be prepared for and reviewed with the landowner or operator. The plan shall contain guidance to maintain the embankment, design capacity, vegetative cover and outlet.

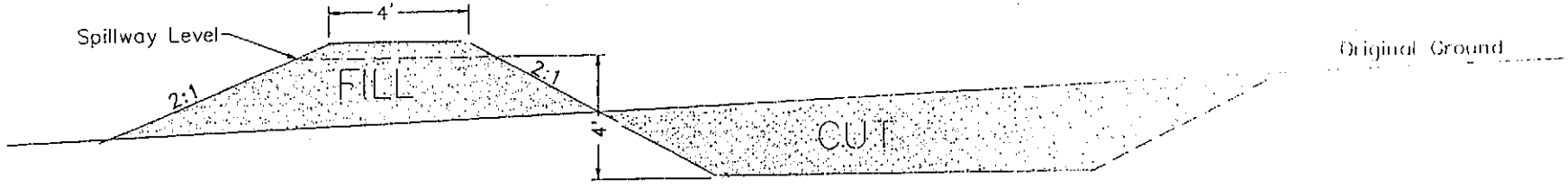
All plans shall include a provision that after each large storm, basins must be inspected and needed maintenance performed. When sediment storage is full, accumulated sediment must be removed or the basin must be redesigned and modified to restore capacity.

Where designs include underground outlets, O&M plans should include checking for clogging and/or pipe damage.

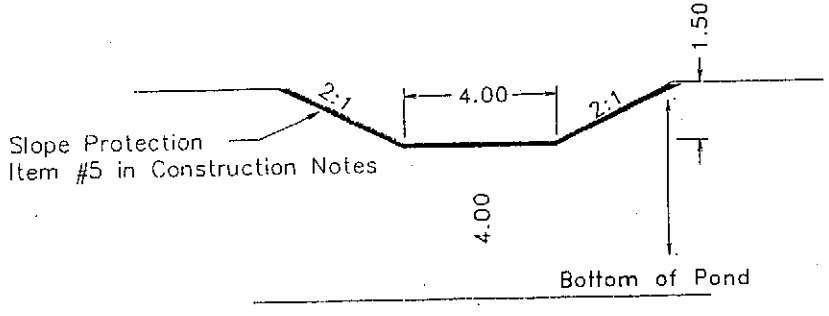


ORTHOGRAPHIC VIEW OF DETENTION POND

(SHAPE MAY VARY)



PROFILE OF DETENTION POND

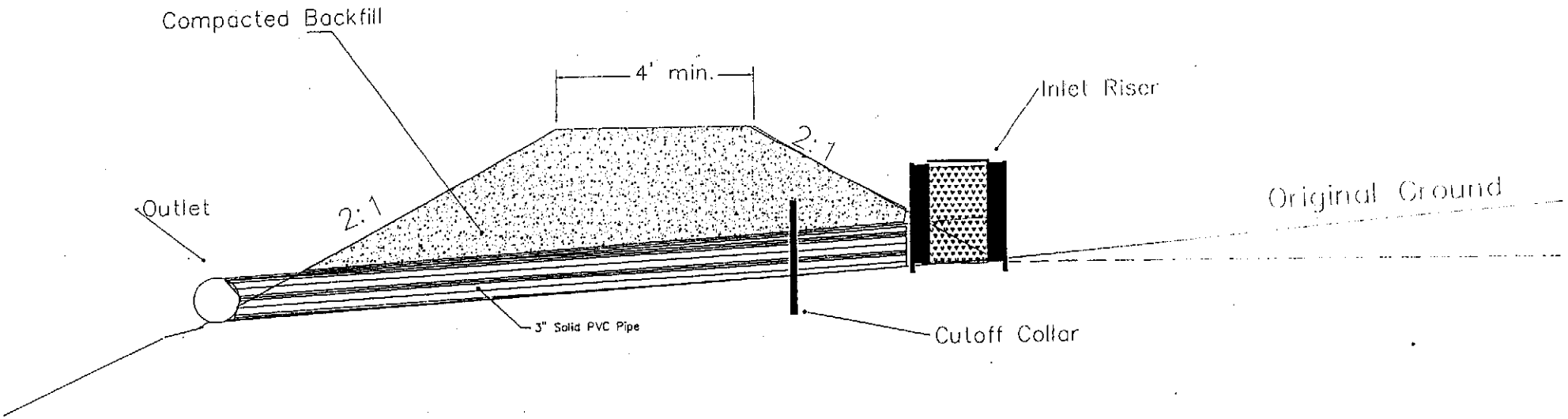


DETAIL OF SPILLWAY

(All Views Are Not to Sc

Typical Water & Sediment Control Basin

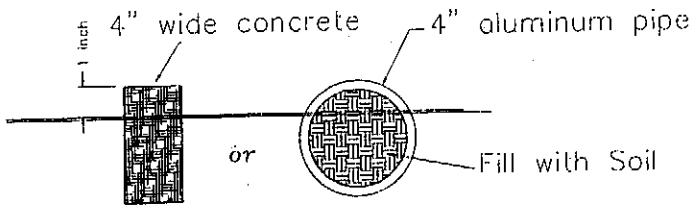
USDA - NRCS



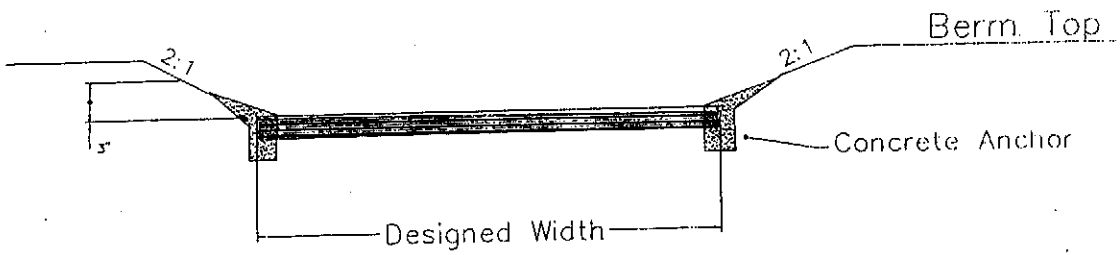
X-Section of a Basin w/ Riser
(not to scale)

Typical Water & Sediment Control Basin

USDA NRCS

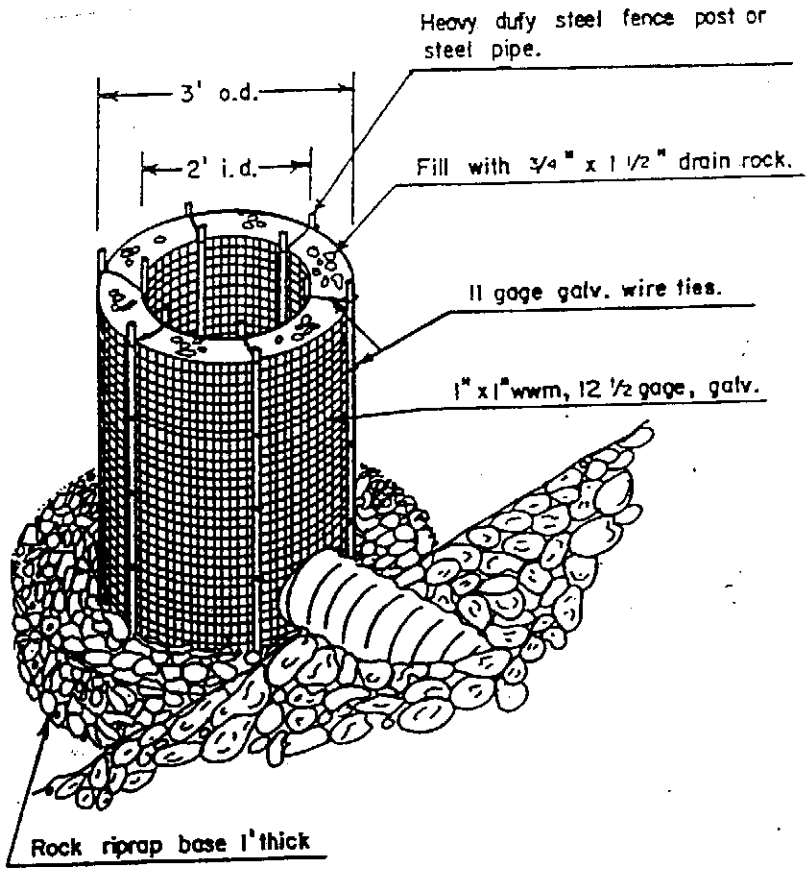


Options for Sill



Longitudinal View Along
Emergency Spillway or Sill
(not to scale)

SPILLWAY OR SILL DETAIL



INLET RISER DETAIL

Typical Water & Sediment Control Basin

USDA - NRCS

Appendix 4: U.S. Army Corps of Engineers Nationwide Permit 13 and General Conditions to the Nationwide Permit Program

It is acknowledged that the following U.S. Army Corps of Engineers Nationwide Permit 13 may contain language that differs from the Project Description and Environmental Protection and Mitigation Measures contained in the Marin Resource Conservation District's Initial Study and Mitigated Negative Declaration for the Marin Coastal Watersheds Permit Coordination Program. When regulatory agencies have different standards for issuing permits, this program adopts the most restrictive. When this program references other documents that may contain less restrictive standards, only the more restrictive standards will be used.

U S Army Corps of Engineers
Sacramento District

Nationwide Permit Summary

33 CFR Part 330; Issuance of Nationwide Permits – January 15, 2002, including Correction – February 13, 2002

13. Bank Stabilization. Bank stabilization activities necessary for erosion prevention provided the activity meets all of the following criteria:

a. No material is placed in excess of the minimum needed for erosion protection;

b. The bank stabilization activity is less than 500 feet in length;

c. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line;

d. No material is placed in any special aquatic site, including wetlands;

e. No material is of the type, or is placed in any location, or in any manner, to impair surface water flow into or out of any wetland area;

f. No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,

g. The activity is part of a single and complete project.

Bank stabilization activities in excess of 500 feet in length or greater than an average of one cubic yard per running foot may be authorized if the permittee notifies the District Engineer in accordance with the "*Notification*" General Condition 13 and the District Engineer determines the activity complies with the other terms and conditions of the NWP and the adverse environmental effects are minimal both individually and cumulatively. This NWP may not be used for the channelization of waters of the US. (Sections 10 and 404)

A. <u>General Conditions</u>. The following general conditions must be followed in order for any authorization by an NWP to be valid:

☐ **1. Navigation**. No activity may cause more than a minimal adverse effect on navigation.

☐ **2. Proper Maintenance**. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

☐ **3. Soil Erosion and Sediment Controls**. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

☐ **4. Aquatic Life Movements**. No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

☐ **5. Equipment**. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

☐ **6. Regional and Case-By-Case Conditions**. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its Section 401 Water Quality Certification and Coastal Zone Management Act consistency determination.

☐ **7. Wild and Scenic Rivers**. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

☐ **8. Tribal Rights**. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

☐ **9. Water Quality.**

☐ (a) In certain states and tribal lands an individual 401 Water Quality Certification must be obtained or waived (See 33 CFR 330.4(c)).

☐ (b) For NWPs 12, 14, 17, 18, 32, 39, 40, 42, 43, and 44, where the state or tribal 401 certification (either generically or individually) does not require or approve water quality management measures, the permittee must provide water quality management measures that will ensure that the authorized work does not result in more than minimal degradation of water quality (or the Corps determines that compliance with state or local standards, where applicable, will ensure no more than minimal adverse effect on water quality). An important component of water quality management includes stormwater management that

minimizes degradation of the downstream aquatic system, including water quality (refer to General Condition 21 for stormwater management requirements). Another important component of water quality management is the establishment and maintenance of vegetated buffers next to open waters, including streams (refer to General Condition 19 for vegetated buffer requirements for the NWPs).

This condition is only applicable to projects that have the potential to affect water quality. While appropriate measures must be taken, in most cases it is not necessary to conduct detailed studies to identify such measures or to require monitoring.

☐ **10. Coastal Zone Management**. In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see 33 CFR 330.4(d)).

☐ **11. Endangered Species**.

☐ (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or is located in the designated critical habitat and shall not begin work on the activity until notified by the District Engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that may affect Federally-listed endangered or threatened species or designated critical habitat, the notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the FWS or NMFS the District Engineer may add species-specific regional endangered species conditions to the NWPs.

☐ (b) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their world wide web pages at http://www.fws.gov/r9endspp/endspp.html and http://www.nfms.noaa.gov/prot_res/overview/es.html respectively.

☐ **12. Historic Properties**. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

☐ **13. Notification**.

☐ (a) Timing; where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a preconstruction notification (PCN) as early as possible. The District Engineer must determine if the notification is complete within 30 days of the date of receipt and can request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the District Engineer will notify the prospective permittee that the notification is still incomplete and the PCN review process will not commence until all of the requested information has been received by the District Engineer. The prospective permittee shall not begin the activity:

☐ (1) Until notified in writing by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

☐ (2) If notified in writing by the District or Division Engineer that an Individual Permit is required; or

☐ (3) Unless 45 days have passed from the District Engineer's receipt of the complete notification and the prospective permittee has not received written notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

☐ (b) Contents of Notification: The notification must be in writing and include the following information:

☐ (1) Name, address and telephone numbers of the prospective permittee;

☐ (2) Location of the proposed project;

☐ (3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), Regional General Permit(s), or Individual Permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP (Sketches usually clarify the project and when provided result in a quicker decision.);

☐ (4) For NWPs 7, 12, 14, 18, 21, 34, 38, 39, 40, 41, 42, and 43, the PCN must also include a delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds), and riffle and pool complexes (see paragraph 13(f));

☐ (5) For NWP 7 (Outfall Structures and Maintenance), the PCN must include information regarding the original design capacities and configurations of those areas of the facility where maintenance dredging or excavation is proposed;

☐ (6) For NWP 14 (Linear Transportation Projects), The PCN must include a compensatory mitigation proposal to offset permanent losses of waters of the US and a statement describing how temporary losses of waters of the US will be minimized to the maximum extent practicable;

☐ (7) For NWP 21 (Surface Coal Mining Activities), the PCN must include an Office of Surface Mining (OSM) or state-approved mitigation plan, if applicable. To be authorized by this NWP, the District Engineer must determine that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are minimal both individually and cumulatively and must notify the project sponsor of this determination in writing;

☐ (8) For NWP 27 (Stream and Wetland Restoration Activities), the PCN must include documentation of the prior condition of the site that will be reverted by the permittee;

☐ (9) For NWP 29 (Single-Family Housing), the PCN must also include:

☐ (i) Any past use of this NWP by the Individual Permittee and/or the permittee's spouse;

☐ (ii) A statement that the single-family housing activity is for a personal residence of the permittee;

☐ (iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring ¼-acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than ¼-acre in size, formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

☐ (iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

☐ (10) For NWP 31 (Maintenance of Existing Flood Control Facilities), the prospective permittee must either notify the District Engineer with a PCN prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

☐ (i) Sufficient baseline information identifying the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided the approved flood control protection or drainage is not increased;

☐ (ii) A delineation of any affected special aquatic sites, including wetlands; and,

☐ (iii) Location of the dredged material disposal site;

☐ (11) For NWP 33 (Temporary Construction, Access, and Dewatering), the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources;

☐ (12) For NWPs 39, 43 and 44, the PCN must also include a written statement to the District Engineer explaining how avoidance and minimization for losses of waters of the US were achieved on the project site;

☐ (13) For NWP 39 and NWP 42, the PCN must include a compensatory mitigation proposal to offset losses of waters of the US or justification explaining why compensatory mitigation should not be required. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

☐ (14) For NWP 40 (Agricultural Activities), the PCN must include a compensatory mitigation proposal to offset losses of waters of the US. This NWP does not authorize the relocation of greater than 300 linear-feet of existing serviceable drainage ditches constructed in non-tidal streams unless, for drainage ditches constructed in intermittent non-tidal streams, the District Engineer waives this criterion in writing, and the District Engineer has determined that the project complies with all terms and conditions of this NWP, and that any adverse impacts of the project on the aquatic environment are minimal, both individually and cumulatively;

☐ (15) For NWP 43 (Stormwater Management Facilities), the PCN must include, for the construction of new stormwater management facilities, a maintenance plan (in accordance with state and local requirements, if applicable) and a compensatory mitigation proposal to offset losses of waters of the US. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;

☐ (16) For NWP 44 (Mining Activities), the PCN must include a description of all waters of the US adversely affected by the project, a description of measures taken to minimize adverse effects to waters of the US, a description of measures taken to comply with the criteria of the NWP, and a reclamation plan (for all aggregate mining activities in isolated waters and non-tidal wetlands adjacent to headwaters and any hard rock/mineral mining activities);

☐ (17) For activities that may adversely affect Federally-listed endangered or threatened species, the PCN must include the name(s) of those endangered or threatened species that may be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work; and

☐ (18) For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

☐ (c) Form of Notification: The standard Individual Permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(18) of General Condition 13. A letter containing the requisite information may also be used.

☐ (d) District Engineer's Decision: In reviewing the PCN for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may submit a proposed mitigation plan with the PCN to expedite the process. The District Engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the District Engineer will notify the permittee and include any conditions the District Engineer deems necessary. The District Engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal may be either conceptual or detailed. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the District Engineer will expeditiously review the proposed compensatory mitigation plan. The District Engineer must review the plan within 45 days of receiving a complete PCN and determine whether the conceptual or specific proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

☐ If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then the District Engineer will notify the applicant either:

☐ (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an Individual Permit;

☐ (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level; or

☐ (3) that the project is authorized under the NWP with specific modifications or conditions. Where the District Engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level. When conceptual mitigation is included, or a mitigation plan is required under item (2) above, no work in waters of the US will occur until the District Engineer has approved a specific mitigation plan.

☐ (e) Agency Coordination: The District Engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

☐ For activities requiring notification to the District Engineer that result in the loss of greater than ½-acre of waters of the US, the District Engineer will provide immediately (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy to the appropriate Federal or state offices (USFWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 15 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. As required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer will provide a response to NMFS within 30 days of receipt of any Essential Fish Habitat conservation recommendations. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

☐ (f) Wetland Delineations: Wetland delineations must be prepared in accordance with the current method required by the Corps (For NWP 29 see paragraph (b)(9)(iii) for parcels less than ¼-acre in size). The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 45-day period will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

☐ **14. Compliance Certification**. Every permittee who has received NWP verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include:

☐ (a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;

☐ (b) A statement that any required mitigation was completed in accordance with the permit conditions; and (c) The signature of the permittee certifying the completion of the work and mitigation.

☐ **15. Use of Multiple Nationwide Permits.** The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit (e.g. if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1/3-acre).

☐ **16. Water Supply Intakes**. No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in the proximity of a public water supply intake except where the activity is for repair of the public water supply intake structures or adjacent bank stabilization.

☐ **17. Shellfish Beds**. No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4.

☐ **18. Suitable Material**. No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the CWA).

☐ **19. Mitigation**. The District Engineer will consider the factors discussed below when determining the acceptability of appropriate and practicable mitigation necessary to offset adverse effects on the aquatic environment that are more than minimal.

☐ (a) The project must be designed and constructed to avoid and minimize adverse effects to waters of the US to the maximum extent practicable at the project site (i.e., on site).

☐ (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

☐ (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland impacts requiring a PCN, unless the District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. Consistent with National policy, the District Engineer will establish a preference for restoration of wetlands as compensatory mitigation, with preservation used only in exceptional circumstances.

☐ (d) Compensatory mitigation (i.e., replacement or substitution of aquatic resources for those impacted) will not be used to increase the acreage losses allowed by the acreage limits of some of the NWPs. For example, ¼-acre of wetlands cannot be created to change a ¾-acre loss of wetlands to a ½-acre loss associated with NWP 39 verification. However, ½-acre of created wetlands can be used to reduce the impacts of a ½-acre loss of wetlands to the minimum impact level in order to meet the minimal impact requirement associated with NWPs.

☐ (e) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferably in the same watershed.

☐ (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., easements, deed restrictions) of vegetated buffers to open waters. In many cases, vegetated buffers will be the only compensatory mitigation required. Vegetated buffers should consist of native species. The width of the vegetated buffers required will address documented water quality or aquatic habitat loss concerns. Normally, the vegetated buffer will be 25 to 50 feet wide on each side of the stream, but the District Engineers may require slightly wider vegetated buffers to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the Corps will determine the appropriate compensatory mitigation (e.g., stream buffers or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where vegetated buffers are determined to be the most appropriate form of compensatory mitigation, the District Engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland impacts.

☐ (g) Compensatory mitigation proposals submitted with the "notification" may be either conceptual or detailed. If conceptual plans are approved under the verification, then the Corps will condition the verification to require detailed plans be submitted and approved by the Corps prior to construction of the authorized activity in waters of the US.

☐ (h) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases that require compensatory mitigation, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

☐ **20. Spawning Areas**. Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of an important spawning area are not authorized.

☐ **21. Management of Water Flows**. To the maximum extent practicable, the activity must be designed to maintain preconstruction downstream flow conditions (e.g., location, capacity, and flow rates). Furthermore, the activity must not permanently restrict or impede the passage of normal or expected high flows (unless the primary purpose of the fill is to impound waters) and the structure or discharge of dredged or fill material must withstand expected high flows. The activity must, to the maximum extent practicable, provide for retaining excess flows from the site, provide for maintaining surface flow rates from the site similar to preconstruction conditions, and provide for not increasing water flows from the project site, relocating water, or redirecting water flow beyond preconstruction conditions. Stream channelizing will be reduced to the minimal amount necessary, and the activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site, unless the activity is part of a larger system designed to manage water flows. In most cases, it will not be a requirement to conduct detailed studies and monitoring of water flow.

This condition is only applicable to projects that have the potential to affect waterflows. While appropriate measures must be taken, it is not necessary to conduct detailed studies to identify such measures or require monitoring to ensure their effectiveness. Normally, the Corps will defer to state and local authorities regarding management of water flow.

☐ **22 Adverse Effects From Impoundments**. If the activity creates an impoundment of water, adverse effects to the aquatic system due to the acceleration of the passage of water, and/or the restricting its flow shall be minimized to the maximum extent practicable. This includes structures and work in navigable waters of the US, or discharges of dredged or fill material.

☐ **23. Waterfowl Breeding Areas**. Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

☐ **24. Removal of Temporary Fills**. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

☐ **25. Designated Critical Resource Waters**. Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, National Wild and Scenic Rivers, critical habitat for Federally listed threatened and endangered species, coral reefs, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the District Engineer after notice and opportunity for public comment. The District Engineer may also designate additional critical resource waters after notice and opportunity for comment.

☐ (a) Except as noted below, discharges of dredged or fill material into waters of the US are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, and 44 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. Discharges of dredged or fill materials into waters of the US may be authorized by the above NWPs in National Wild and Scenic Rivers if the activity complies with General Condition 7. Further, such discharges may be authorized in designated critical habitat for Federally listed threatened or endangered species if the activity complies with General Condition 11 and the USFWS or the NMFS has concurred in a determination of compliance with this condition.

☐ (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with General Condition 13, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The District Engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

☐ **26 Fills Within 100-Year Floodplains.** For purposes of this General Condition, 100-year floodplains will be identified through the existing Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps or FEMA-approved local floodplain maps**.**

☐ (a) Discharges in Floodplain; Below Headwaters. Discharges of dredged or fill material into waters of the US within the mapped 100-year floodplain, below headwaters (i.e. five cfs), resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, 43, and 44.

☐ (b) Discharges in Floodway; Above Headwaters. Discharges of dredged or fill material into waters of the US within the FEMA or locally mapped floodway, resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, and 44.

☐ (c) The permittee must comply with any applicable FEMA-approved state or local floodplain management requirements.

☐ **27. Construction Period**. For activities that have not been verified by the Corps and the project was commenced or under contract to commence by the expiration date of the NWP (or modification or revocation date), the work must be completed within 12-months after such date (including any modification that affects the project).

☐ For activities that have been verified and the project was commenced or under contract to commence within the verification period, the work must be completed by the date determined by the Corps.

☐ For projects that have been verified by the Corps, an extension of a Corps approved completion date may requested. This request must be submitted at least one month before the previously approved completion date.

B. <u>Further Information</u>

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

C. <u>Regional Conditions for Nationwide Permits – Sacramento District</u>

I. Regional Conditions to be applied across the entire Sacramento District:

☐ **1.** Nationwide Permits 14, 29, 39, 40, 41, 42, and 44 are withdrawn from used in histosols, including fens. For the used of all other nationwide permits in fens, project proponents are required to notify the Corps using the notification or PCN procedures of the nationwide permit program (General Condition 13). This will be a "Corps only" notification.

☐ **2.** For all activities using any existing and proposed nationwide permits, mitigation that is required by special condition must be completed before or concurrent with project construction. Where project mitigation involves the use of a mitigation bank or in-lieu fee, payment must be made to the bank or fee-in-lieu program before commencing construction of the permitted activity.

☐ **3.** For all nationwide permits requiring notification, except 27, the applicant must provide a written statement to the district engineer explaining how avoidance and minimization of loses of waters of the United States were achieved on the project site.

II. Regional conditions to be applied in California and Nevada.

☐ All existing and proposed nationwide permits are suspended in the Lake Tahoe basin in favor of using General Permit 16.

III. Regional conditions to be applied in Utah

☐ For use of any nationwide permit with the following attributes, notification of the Corps of Engineers' Utah Regulatory Office, using the "Notification" procedures of the Nationwide Permit Program (General Condition 13), is required, except where certain nationwide permits are restricted and can not be used as indicated in each category. This will be a "Corps only" notification.

☐ 1. All activities that will affect waters of the U.S. below the elevation 4217 feet msl adjacent to the Great Salt Lake and below 4500 feet msl adjacent to Utah Lake.

☐ 2. Bank stabilization in a perennial stream that would affect more than 100 feet of stream length as measured from the upstream portion of the affected bank to the downstream section, narrow the cross-section of the stream, substantially reduce the riparian vegetation, or increase velocities.

☐ 3. All activities that will affect springs. A spring is an aquatic feature caused by ground water being discharged to the surface, creating wetland and/or stream characteristics. Nationwide Permits 14, 16, 18, 29, 33, 36, 40, 42, 43, and 44 can not be used in spring areas.

Appendix 5: U.S. Army Corps of Engineers Nationwide Permit 27 as Annotated for the Permit Coordination Program

It is acknowledged that the following U.S. Army Corps of Engineers Nationwide Permit 27 may contain language that differs from the Project Description and Environmental Protection and Mitigation Measures contained in the Marin Resource Conservation District's Initial Study and Mitigated Negative Declaration for the Marin Coastal Watersheds Permit Coordination Program. When regulatory agencies have different standards for issuing permits, this program adopts the most restrictive. When this program references other documents that may contain less restrictive standards, only the more restrictive standards will be used.

U S Army Corps of Engineers
Sacramento District

Nationwide Permit Summary

33 CFR Part 330; Issuance of Nationwide Permits – January 15, 2002, including Correction – February 13, 2002

27. Stream and Wetland Restoration Activities. Activities in waters of the US associated with the restoration of former waters, the enhancement of degraded tidal and non-tidal wetlands and riparian areas, the creation of tidal and non-tidal wetlands and riparian areas, and the restoration and enhancement of non-tidal streams and non-tidal open water areas as follows:

(a) The activity is conducted on:

(1) Non-Federal public lands and private lands, in accordance with the terms and conditions of a binding wetland enhancement, restoration, or creation agreement between the landowner and the U.S. Fish and Wildlife Service (FWS) or the Natural Resources Conservation Service (NRCS), the National Marine Fisheries Service, the National Ocean Service, or voluntary wetland restoration, enhancement, and creation actions documented by the NRCS pursuant to NRCS regulations; or

(2) Reclaimed surface coal mine lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the OSM or the applicable state agency (the future reversion does not apply to streams or wetlands created, restored, or enhanced as mitigation for the mining impacts, nor naturally due to hydrologic or topographic features, nor for a mitigation bank); or

(3) Any other public, private or tribal lands;

(b) *Notification*: For activities on any public or private land that are not described by paragraphs (a)(1) or (a)(2) above, the permittee must notify the District Engineer in accordance with General Condition 13; and

(c) Planting of only native species should occur on the site.

Activities authorized by this NWP include, to the extent that a Corps permit is required, but are not limited to: the removal of accumulated sediments; the installation, removal, and maintenance of small water control structures, ~~dikes, and berms~~; the installation of current deflectors; the enhancement, restoration, or creation of riffle and pool stream structure; the placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or create stream meanders; the backfilling of artificial channels and drainage ditches; the removal of existing drainage structures; ~~the construction of small nesting islands~~; the construction of open water areas; ~~the construction of oyster habitat over unvegetated bottom in tidal waters~~; activities needed to reestablish vegetation, including plowing or discing for seed bed preparation and the planting of appropriate wetland species; mechanized land clearing to remove non-native invasive. exotic or nusiance vegetation; and other related activities.

This NWP does not authorize the conversion of a stream to another aquatic use, such as the creation of an impoundment for waterfowl habitat. This NWP does not authorize stream channelization. This NWP does not authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed. ~~However, this NWP authorizes the relocation of non-tidal waters, including non-tidal wetlands, on the project site provided there are net gains in aquatic resource functions and values. For example, this NWP may authorize the creation of an open water impoundment in a non-tidal emergent wetland, provided the non-tidal emergent wetland is replaced by creating that wetland type on the project site. This NWP does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.~~

~~*Reversion.* For enhancement, restoration, and creation projects conducted under paragraphs (a)(3), this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit would be required for any reversion. For restoration, enhancement, and creation projects conducted under paragraphs (a)(1) and (a)(2), this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or creation activities). The reversion must occur within five years after expiration of a limited term wetland restoration or creation agreement or permit, even if the discharge occurs after this NWP expires. This NWP also authorizes the reversion of wetlands that were restored, enhanced, or created on prior-converted cropland that has not been abandoned, in accordance with a binding agreement between the landowner and NRCS or FWS (even though the restoration, enhancement, or creation activity did not require a Section 404 permit). The five-year reversion limit does not apply to agreements without time limits reached under paragraph (a)(1). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate state agency executing the agreement or permit. Before any reversion activity the permittee or the appropriate Federal or state agency must notify the District Engineer and include the documentation of the prior condition. Once an area has reverted to its prior physical condition, it will be subject to whatever the Corps Regulatory requirements will be at that future date. (Sections 10 and 404)~~

Note: Compensatory mitigation is not required for activities authorized by this NWP, provided the authorized work results in a net increase in aquatic resource functions and values in the project area. ~~This NWP can be used to authorize compensatory mitigation projects, including mitigation banks, provided the permittee notifies the District Engineer in accordance with General Condition 13, and the project includes compensatory mitigation for impacts to waters of the US caused by the authorized work. However, this NWP does not authorize the reversion of an area used for a compensatory mitigation project to its prior condition. NWP 27 can be used to authorized impacts at a mitigation bank, but only in circumstances where it has been approved under the Interagency Federal Mitigation Bank Guidelines~~.